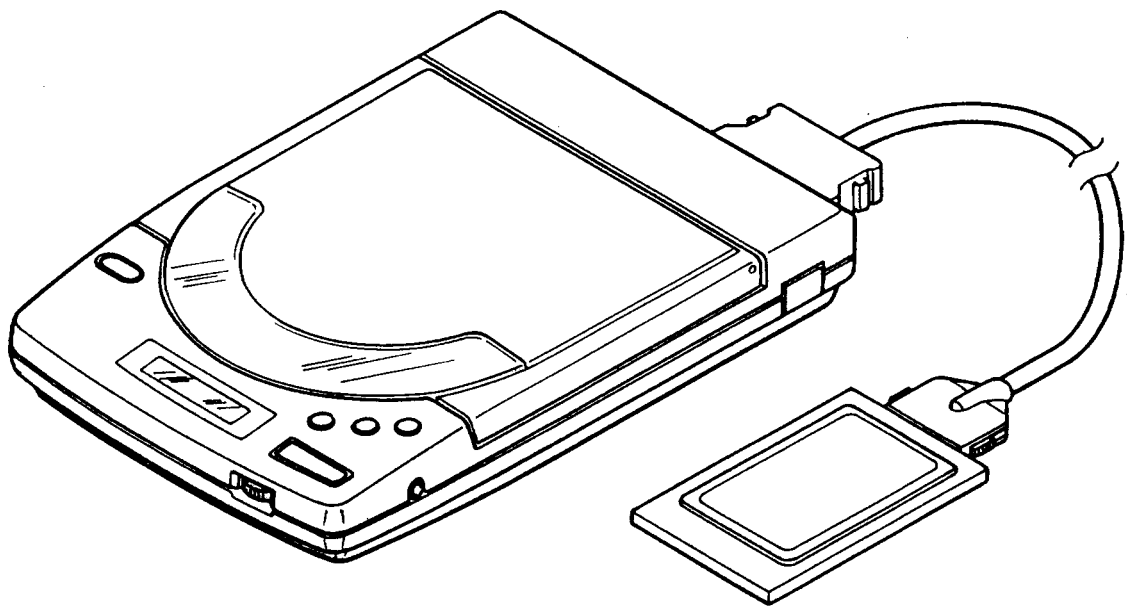
ORDER NO. KM69502537C8

Service Manual

PCMCIA CD-ROM Player

KXL-D720

SD



Panasonic

KXL-D720

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

CAUTION FOR LASER

This product utilizes a laser.
Use of control, adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.
Do not open covers and do not repair yourself. Refer servicing to qualified personnel.

Laser diode properties	
Material	GaAlAs
Laser output	Less than 44.6 μW
Wave length	780 nm
Emission duration	Continuous

(This output is the value measured at the distance of 200 mm from the objective lens surface.)

CLASS 1 LASER PRODUCT
KLASSE 1 LASER PRODUKT
CLASSE 1 LASER PRODUIT
CLASE 1 LASER PRODUCTO

The LASER CLASS 1 label (220-240 V area) is located at the bottom of the unit.

Laser diode properties	
Laser output	5mW MAX
Wave length	788nm
Emition duration	Continuous

Takniska specifikationer för lasern	
Uteffekt:	5mWMAX
Vågländ:	788nm
Effektgrad för strålning:	Kontinuerlig

Laserin Tekniset Tiedot	
Ulosfulo:	5mWMAX
Aallon pituus:	788nm
Säteilyenergia:	Jatkuva

Informasjon angående laserspesifikasjon	
Utgangseffekt:	5mWMAX
Bølgelengde:	788nm
Stråle-effektforhold:	Kontinuerlig

Laserspecifikationer	
Udgangseffekt:	5mWMAX
Bølgelængde:	788nm
Strålingseffekt:	Vedvarende

Contents

1. Specifications and Accessories

1.1 Specifications

Power Source	AC adaptor or six (6) "AA" size batteries
Interface	PCMCIA Type II/SCSI 2
Buffer Size	128 KB
Operating Temperature	5 ℃ (41℉) to 35 ℃ (95℉)
Operating Humidity	20% to 85% RH
Storage Temperature	-20 ℃ (-4℉) to 55 ℃ (131℉)
Storage Humidity	15% to 85% RH
Dimensions	138 (W) x 204 (D) x 35 (H) mm {5.52" x 8.16" x 1.4"}
Mass (Weight)	0.39kg {0.878 lbs.} (without batteries)
Battery Life (when using Panasonic alkaline "AA" size)	approximately 4 hours when playing audio CD at 20 ℃ (68℉) approximately 2 hours when playing CD-ROM at 20 ℃ (68℉)
Power Consumption	· When playing CD-ROM (with PC card) 12W [with AC adaptor] 4.2W [with battery] · When playing audio CD 6.5W [with AC adaptor] 2.8W [with battery] · When player is off 3.0W [with AC adaptor]
Data Transfer Rate	150 KB/sec. (Normal Velocity mode) 300 KB/sec. (Double Velocity mode)
Access Time	· With AC power source: Access time*1 (Double Velocity mode) 295 ms typical (1/3 stroke) Fullstroke access time*2 (Double Velocity mode) 380 ms typical · With battery: Access time*1 (Double Velocity mode) 320 ms typical (1/3 stroke) Fullstroke access time*2 (Double Velocity mode) 400 ms typical

*1 Access time; Average data read over the complete area from 00' 02" 00 blocks to 1/3 stroke track.

*2 Fullstroke access time; Average data read over the complete area from 00' 02" 00 block to 59' 58" 74 block.

The above information (*1, *2) is based on the test results measured by Panasonic internal test software.

Output Connector	PHONES jack
Compatible CD-ROM Format	CD-DA (CD) CD-ROM (Mode 1 and Mode 2 Form 1) Photo CD Multi-session CD-ROM XA (Mode 2 Form 2)
Error Rates	Soft read errors Less than 10^{-9} Hard read errors Less than 10^{-12}
Audio Performance	Frequency response 20 Hz ~20 kHz S/N More than 80 dB (A Range) Output level 0.6 Vrms Audio CD Operation Play/Pause, Stop, Reverse skip, Forward skip Volume control Rotary (0~10)
PC Card and PCMCIA Cable	Card type Type II DTE Interface PCMCIA 2.01/JEIDA 4.1 Power source DC 5V, approximately 80 mA (Typ.) SCSI Connector Half-pitch 50-pin Cable Length 350 mm (without connector) Data transfer rate 2.5 MB/sec (MAX.) PC card Dimensions 54 (W) X 85.6 (D) x 5 (H) mm {2.13" x 3.37" x 0.20"} Mass {Weight} (with cable) 0.1 kg {0.221 lbs.}

System Requirements

For notebook computer	· IBM and compatible computer · PCMCIA 2.01 (TYPE II) card slot PCMCIA controller i82365 100% compatible LSI or IBM Card Service (PCMCIA 1.07, 2.00)or SystemSoft (PCMCIA 2.01, 2.10) or Phoenix PCMPLUS (PCMCIA 2.00, 2.01, 2.10) or CardTalk · PC-DOS 5.0 to 6.3 or MS-DOS 5.0 to 6.2
For desktop computer	· IBM and compatible computer with SCSI Board including ASPI Manager (Adaptec AHA-1542C, Future Domain TMC-1670, etc.) · PC-DOS 5.0 to 6.3 or MS-DOS 3.3 to 6.2

1.2 Accessories

AC Adaptor: 1

PC Card: 1

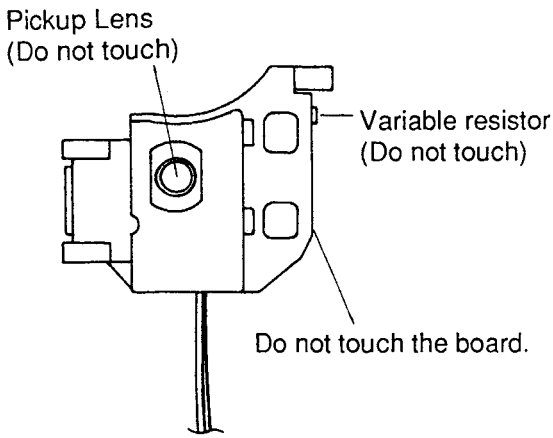
PCMCIA Cable: 1

Setup Disk: 1

2. Handling Precautions for Traverse Deck

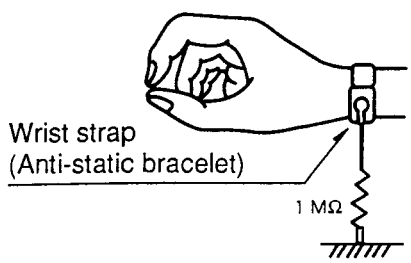
The laser diode in the traverse deck (optical pickup) can be damaged when exposed to static electricity from clothes or human body. Be careful of electrostatic breakdown during repair of the traverse deck (optical pickup).

2.1 Handling the Traverse Deck



1. Do not subject the traverse deck (optical pickup) to static electricity; it is extremely sensitive to electrical shock.
2. Take care not to apply excessive stress to the flexible board.
3. Do not turn the variable resistor (laser power adjustment). It has already been factory preset.

2.2 Grounding Precautions



1. Grounding yourself :

   Use an anti-static wrist strap to discharge the static electricity from your body.

2. Work table grounding

   Place a conductive material sheet or steel sheet on the area where the traverse deck (optical pickup) is placed, and ground the sheet.

Caution :

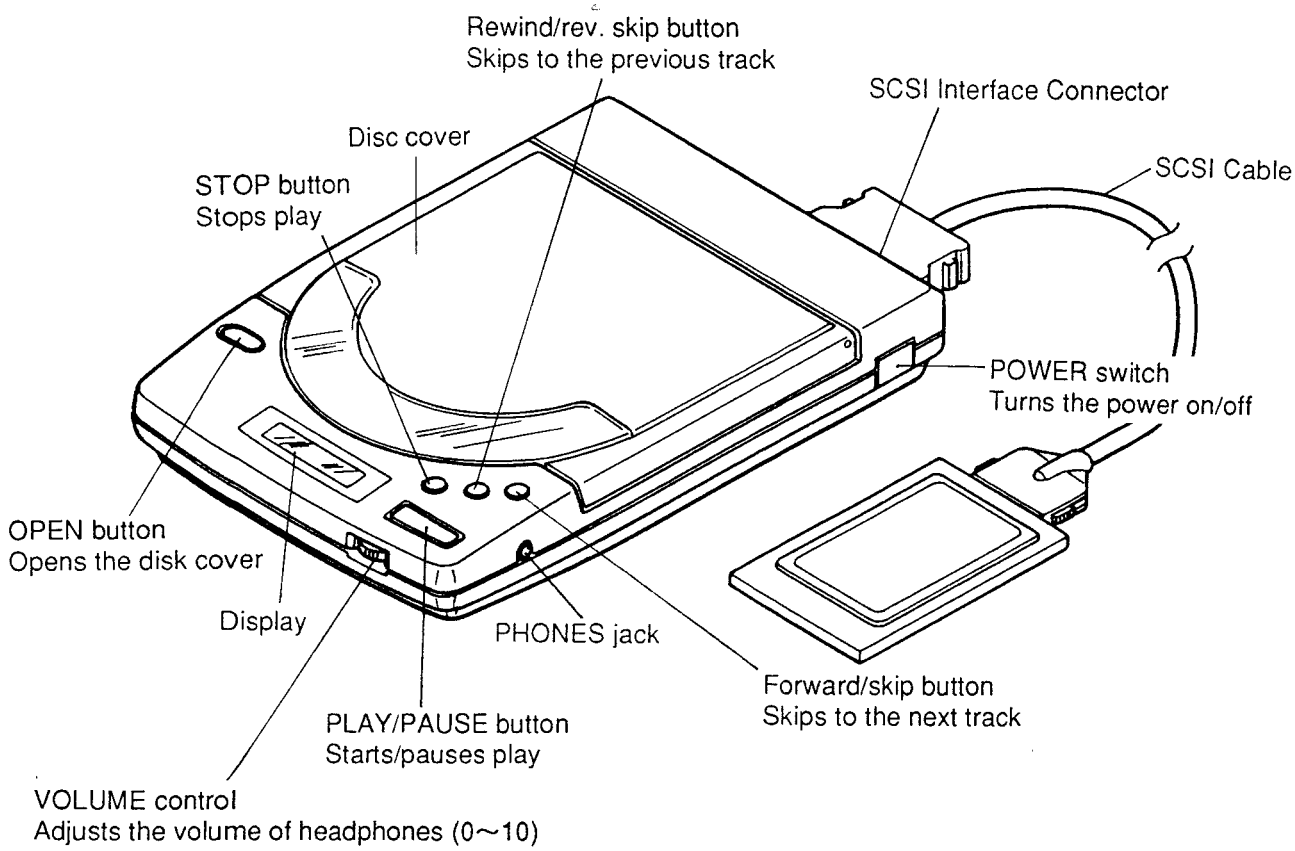
The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the traverse deck (optical pickup).

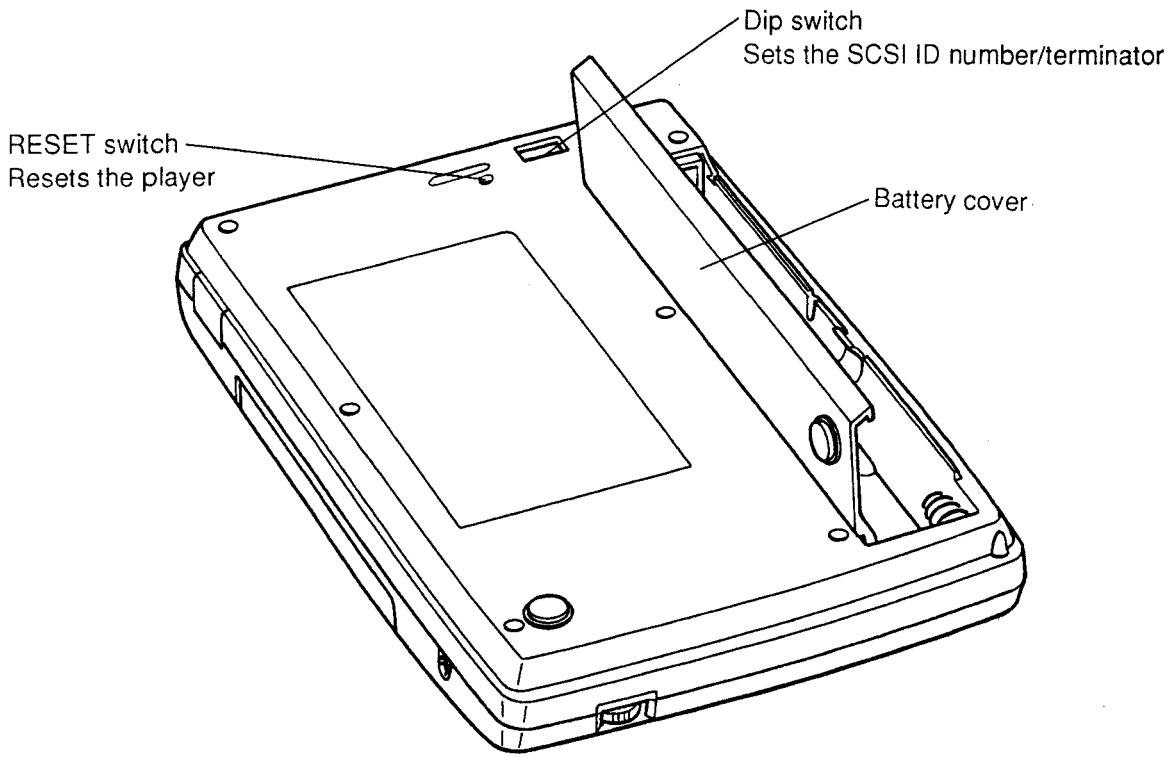
3. Laser Diode Precautions

This unit utilizes a class 1 laser. Invisible laser radiation is emitted from the optical pickup lens when the unit is turned on. Be sure to observe the following precautions.

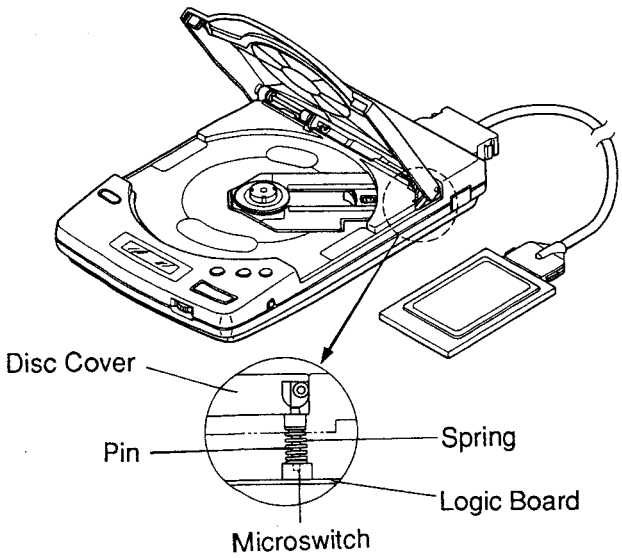
1. Do not look directly into the pickup lens.
2. Do not use optical instruments to look at the pickup lens.
3. Do not adjust the preset variable resistor on the optical pickup.
4. Do not disassemble the optical pickup unit.
5. If the optical pickup is replaced, use the munufacture's specified replacement pickup only.
6. Use of control or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

4. Controls


Rewind/rev. skip button
Skips to the previous track
SCSI Interface Connector
Disc cover
SCSI Cable
STOP button
Stops play
POWER switch
Turns the power on/off
OPEN button
Opens the disk cover
Display
PHONES jack
Forward/skip button
Skips to the next track
PLAY/PAUSE button
Starts/pauses play
VOLUME control
Adjusts the volume of headphones (0~10)


Dip switch
Sets the SCSI ID number/terminator
RESET switch
Resets the player
Battery cover

5. Mechanical Function

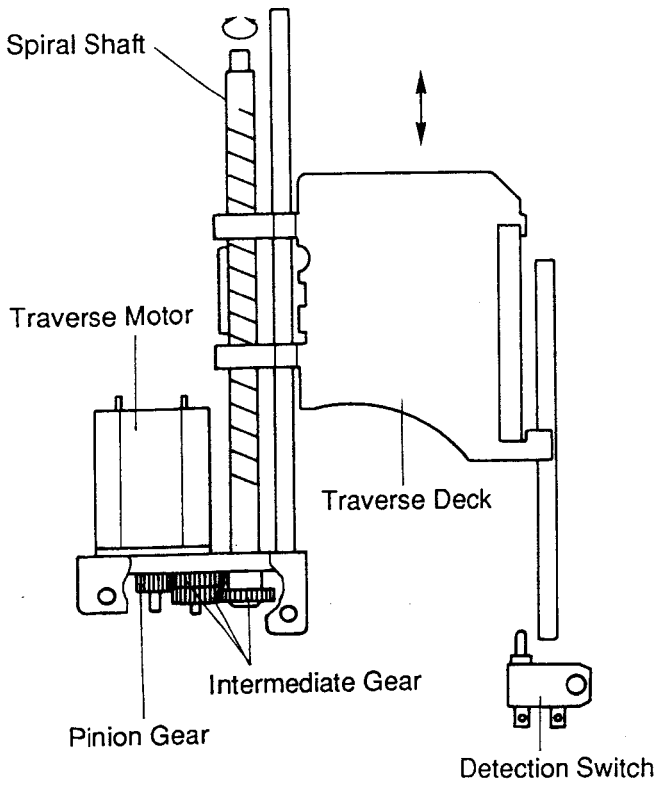


5.1 Safety Interlock Switch

This model has a safety interlock switch, consisting of a microswitch located on the logic board and an interlock switch pin located on the Upper Cover. It is actuated when the disc cover is opened, shutting off the power. This prevents accidental emission of the laser diode while changing the compact disc.

5.2 Traverse Deck Drive Mechanism

This mechanism consists of a motor, 4 gears and spiral shaft. Rotation of the motor is transmitted to the spiral shaft via the motor pinion gear and 3 intermediate gears, which turn the spiral shaft. To scan the disc surface as the spiral shaft turns, the traverse deck moves to the outer or inner side of the disc along the spiral shaft while emitting the light beam from the laser diode.

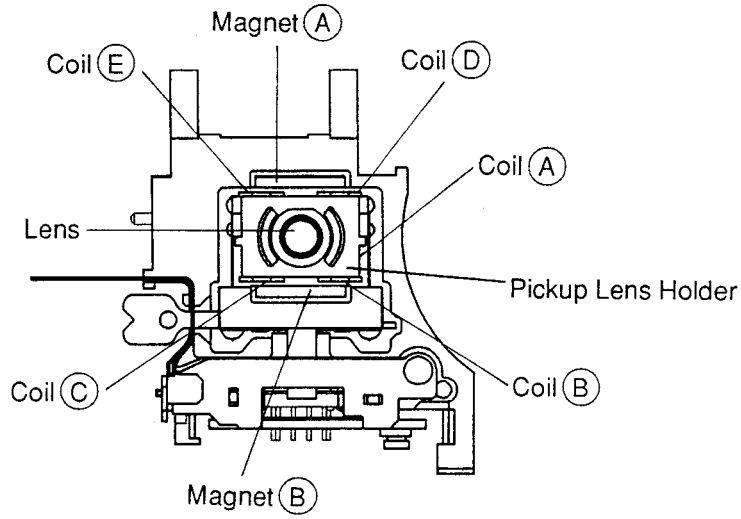


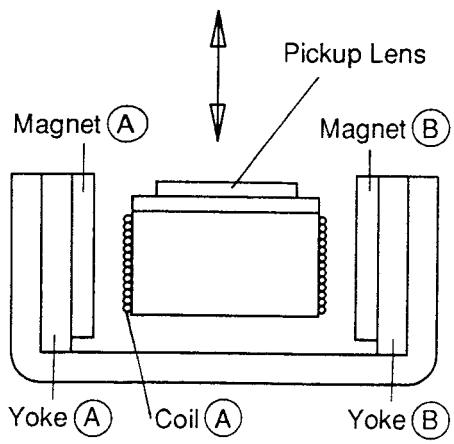
5.3 Home Position Detection Switch

The drive unit base is equipped with a home switch to notify the CPU when the traverse deck is at the extreme inner side. As the traverse deck approaches its home position, the traverse deck pushes the home switch, indicating the traverse deck position to the CPU. Also, when the power switch is turned on or the disc is accessed, this detecting of home position is automatically performed.

5.4 Traverse Deck

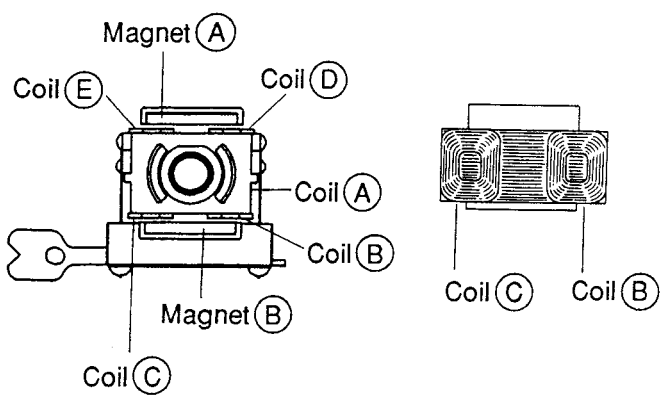
The light beam from the laser diode light source is reflected by the mirror, which is mounted on the pickup lens holder, and focused on the disc surface through the pickup lens. This pickup lens is attached to the pickup lens holder. The pickup lens holder is flexibly supported on the pickup lens holder bracket by the plastic hinge. The pickup lens can be moved up, down, right, or left to focus the light beam on the disc surface.





5.4.1 Up and Down Motion of the Pickup Lens

There is a magnetic field between the permanent magnet Ⓐ (Ⓑ) and yoke Ⓐ (Ⓑ). When the coil Ⓐ is activated, the pickup lens moves up or down according to the electric current direction.

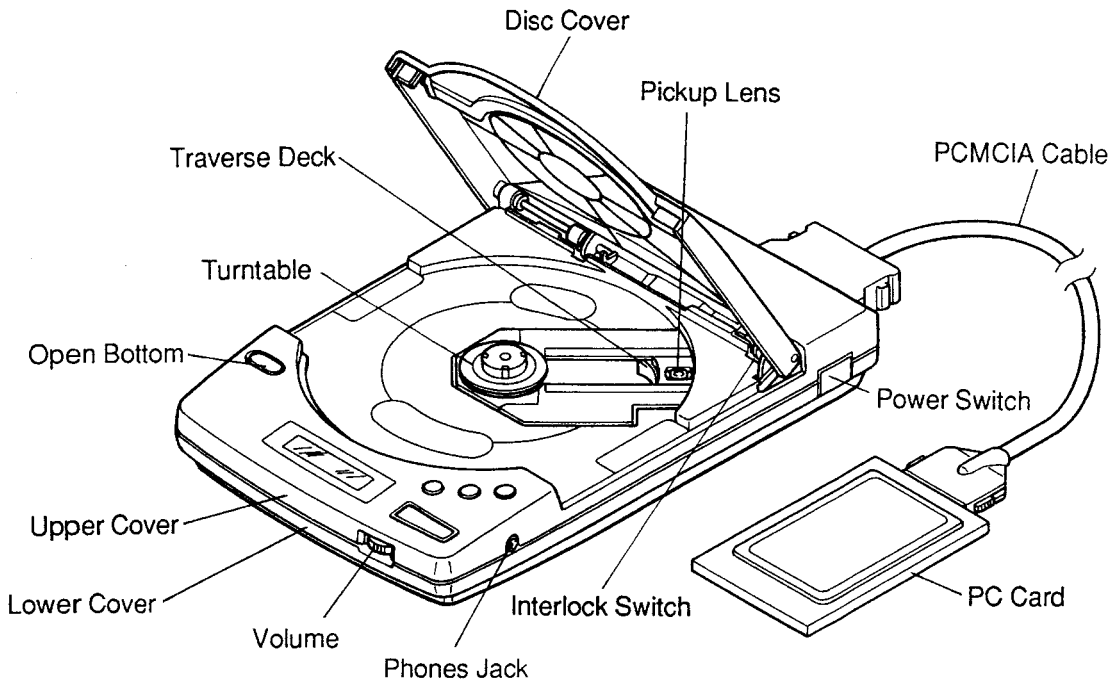


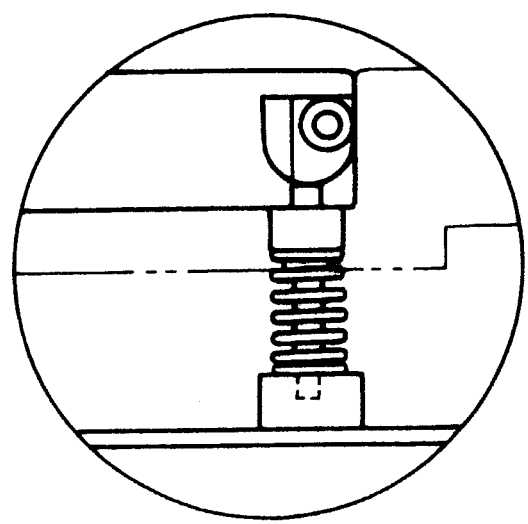
5.4.2 Right and Left Motion of the Pickup Lens

The coil Ⓑ (Ⓓ) and Ⓒ (Ⓔ) are attached to the coil Ⓐ for moving the pickup lens right and left. When the coils Ⓑ (Ⓓ) and Ⓒ (Ⓔ) are activated, they become the electric magnet and receive the repulsion or attraction force from the permanent magnet Ⓐ (Ⓑ). As a result, the pickup lens attached on the pickup lens holder is moved right or left according to the electric current direction.

6. Removal and Replacement Procedures

The laser beam emitted from the laser diode in the traverse deck is used for reading data on the compact disc. It is dangerous to look at or allow the laser beam to contact your body. Normally, the laser beam is emitted from the laser diode only when the safety interlock switch on the main logic board is closed by closing the disc cover. When servicing this model, the laser beam is emitted from the laser diode if the safety interlock switch is activated during power on. Be careful of accidental emission of the laser diode while changing the compact disc or servicing the machine.





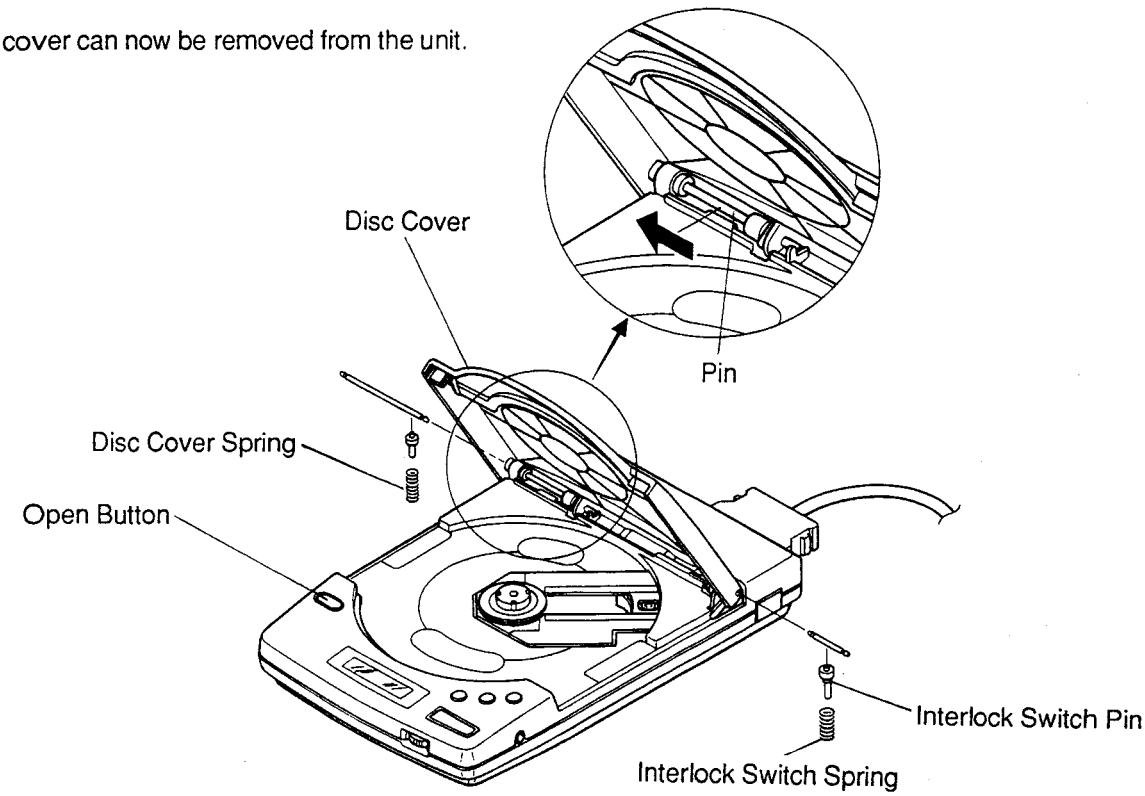
(Safety Interlock)

6.1 Disc Cover

1. Open the disc cover by pushing the open button.
2. Pull out the 2 pins by sliding them as shown in Figure-1.

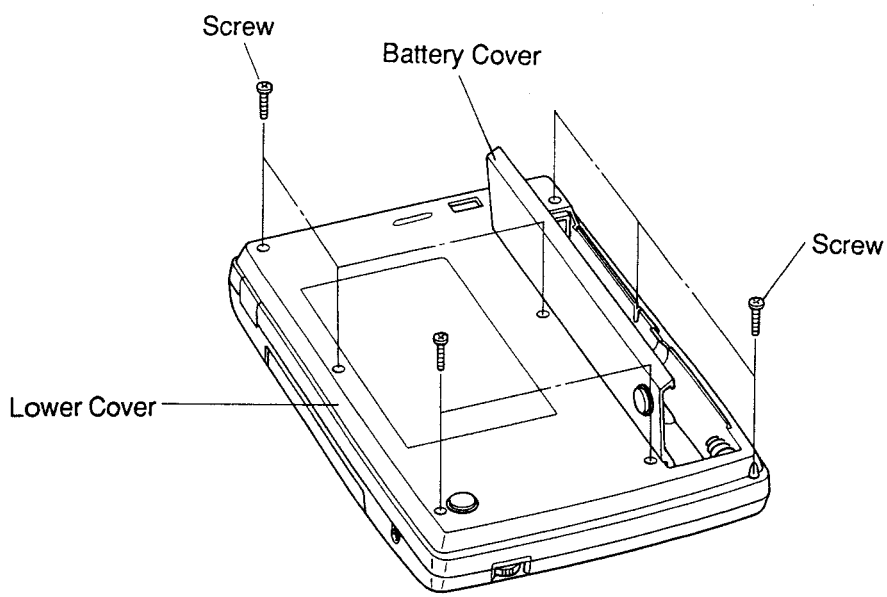
   The disc cover can now be removed from the unit.

Figure-1



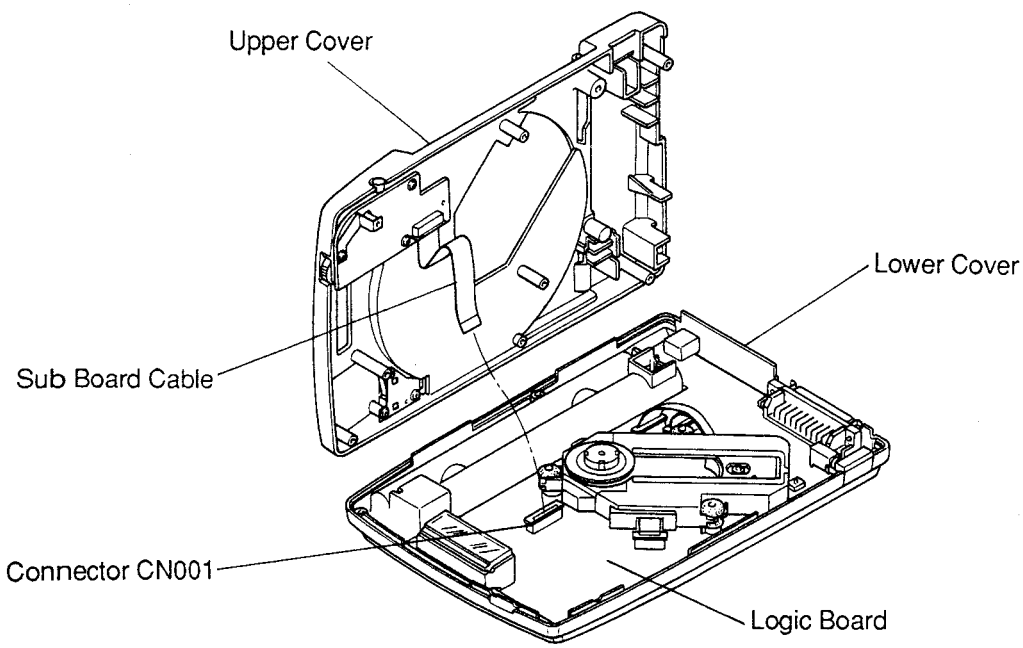
6.2 Upper Cover

1. Remove the 8 screws from the bottom side of the unit.



2. Separate the upper cover from the unit
3. Disconnect the sub board cable from connector CN001 on the logic board.

   The upper cover with the sub board can now be separated from the unit.



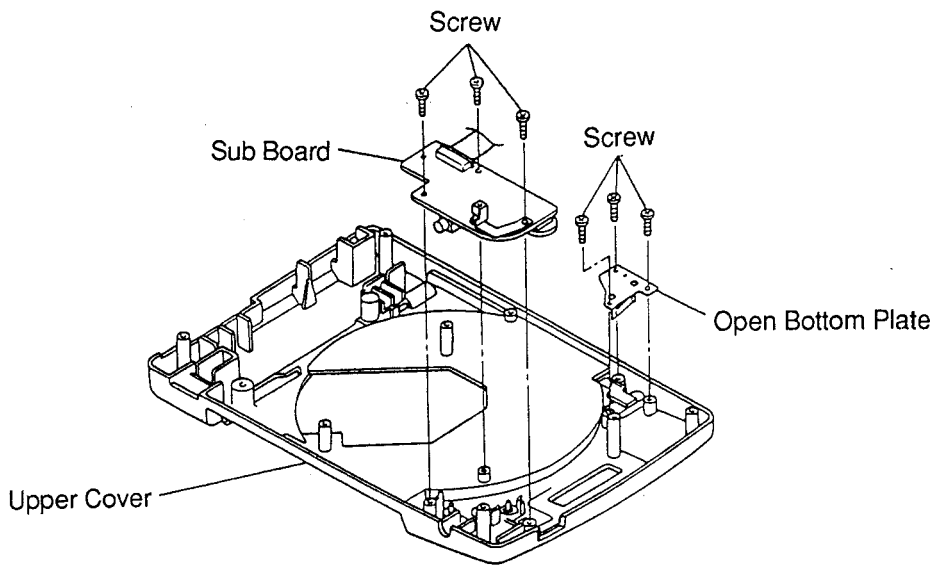
6.3 Sub Board and Open Button

1. Remove the 3 screws on the sub board.

   The sub board and switch button can now be removed from the upper cover.

2. Remove the 3 screws on the open button plate.

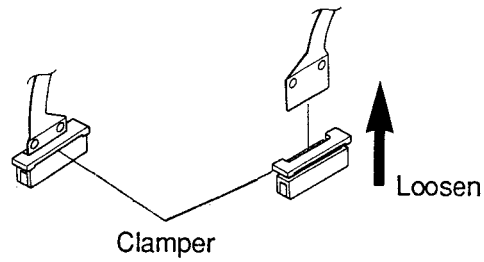
   The open button can now be removed from the upper cover.



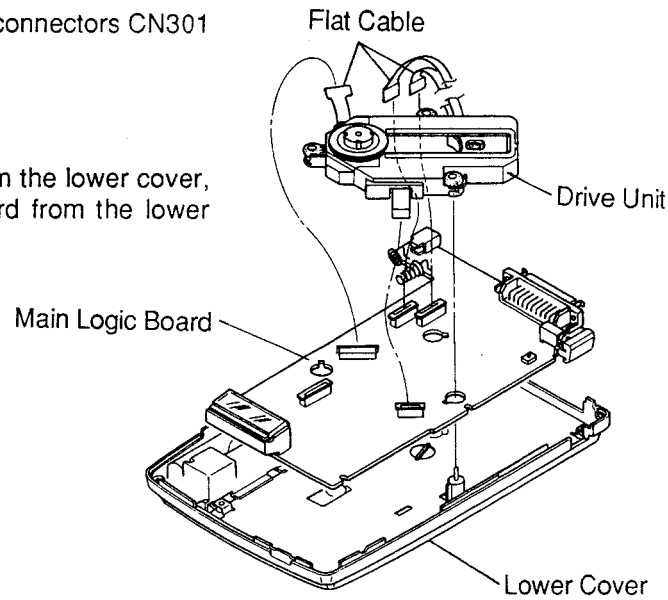
6.4 Drive Unit and Main Logic Board

Caution

For connecting the flat cable to the connector on the main logic board, a special clamping connector is used. When disconnecting the flat cables from the connectors on the main logic board, first the clamper must be loosened as shown in the figure. Then disconnect the flat cable from the connector.



1. Disconnect the 4 flat cables from connectors CN301 ~ CN304 on the main logic board.
2. Remove the drive unit.
3. Release the battery terminals from the lower cover, then remove the main logic board from the lower cover.

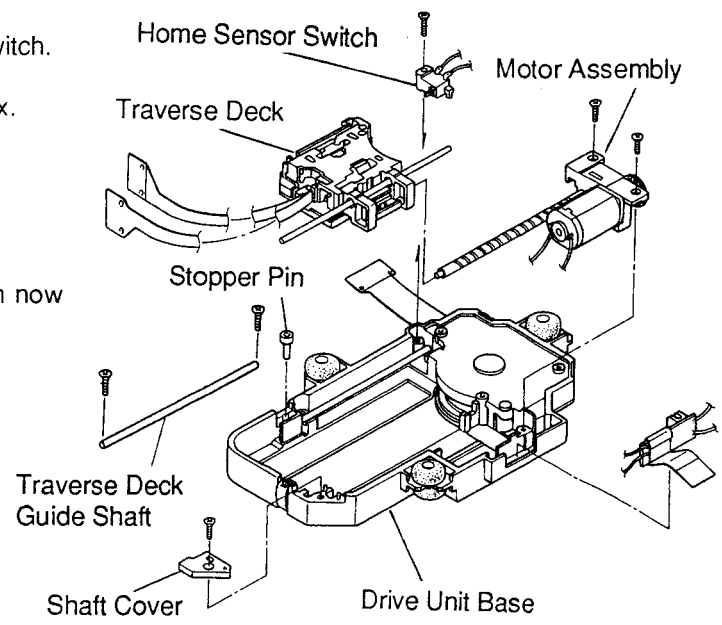


6.5 Drive Unit Disassembly

1. Remove the screw from the Home Sensor Switch.
2. Remove the 2 screws from the motor gear box.
3. Remove the screw from the shaft cover.

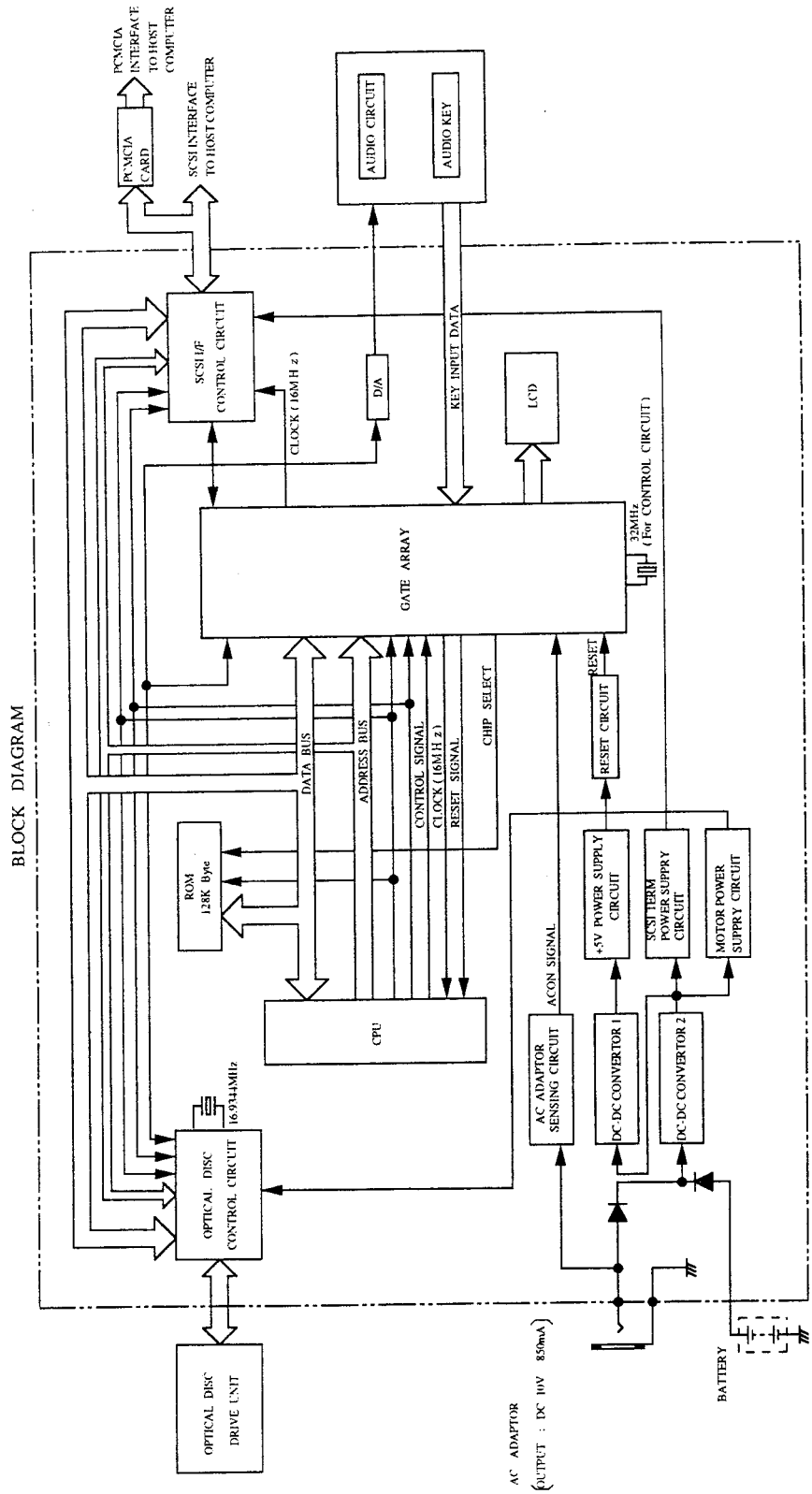
   Remove the FPC stopper pin.

   The motor assembly and traverse deck can now be separated from the drive unit base.
4. Remove the 2 screws from drive unit base.
5. Remove the traverse deck guide shaft.



7. Electronic Circuit Descriptions and Diagrams

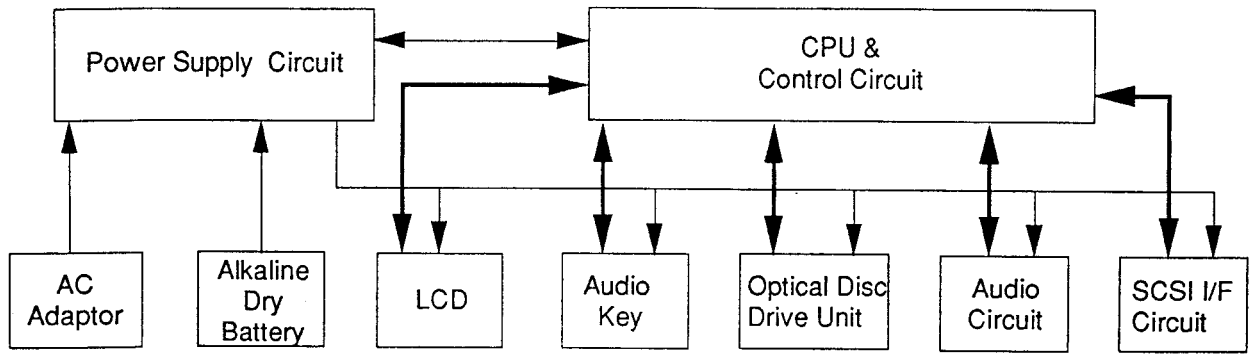
Block Diagram



7.1 Principle of Operation

This chapter explains the basic electronic operation of the CD-ROM player.

This CD-ROM player is comprised mainly of the control circuit, optical disc drive unit, power supply, LCD, audio circuit, SCSI I/F circuit and audio key.
The control circuit is comprised of ROM , gate array and CPU which controls every operation of the CD-ROM player. The control circuit receives the data from the audio key and host computer through the SCSI cable or PCMCIA card cable, then controls the LCD and drives the optical disc drive unit through the optical disc controller. Also this CD-ROM player has AC/DC operation. The power is supplied from the AC adaptor or six AA alkaline batteries through the power supply.



7.2 Power Supply

7.2.1 General Description

The CD-ROM player has two power sources; the AC-adaptor and an alkaline dry battery. When the AC adaptor is attached to the power jack (CN801), the battery power is cut off by diode (D802). When the AC adaptor is removed from the power jack, the power is supplied from the alkaline dry battery.
This power supply circuit has mainly the +VCD1 (+4~7V) power supply circuit (for the spindle motor), +VCD2 (+4~5V), +VCD3 (+3V) power supply circuit (for the optical pickup and the sled motor), +5V power supply circuit (for logic circuit), +VCM power supply circuit (for audio circuit), and +Vif power supply circuit (for SCSI I/F circuit).

a) The +VCD1 Power Supply

The +10Vdc that is supplied by the AC adaptor is stepped down to approximately +7.0V by the DC-TO-DC converter circuit. This circuit is comprised of Q801~Q807, L803, D803, D804, C804, C805, C806, R801, R802, R803, R804, R805 and R822. The output voltage is fixed by D804, R803, R804 and R805.
When the transistor Q807 is turned on, the +VCD1 supplies approximately +5V.
The +VCD1 power supply is energized after transistor Q805 is turned on.

b) The +VCD2, +VCD3 Power Supply

The +VCD2 power supply is generated from +VCD1, which is decreased to about +5V. The +VCD3 power supply is generated from +VCD1, which is decreased to about +3V. The VCD2 power supply is composed of Q813, D807 and R813. The output voltage is fixed by D807. The VCD3 power supply is composed of Q823, D809 and R825. The output voltage is fixed by D809.

c) +5V Power Supply

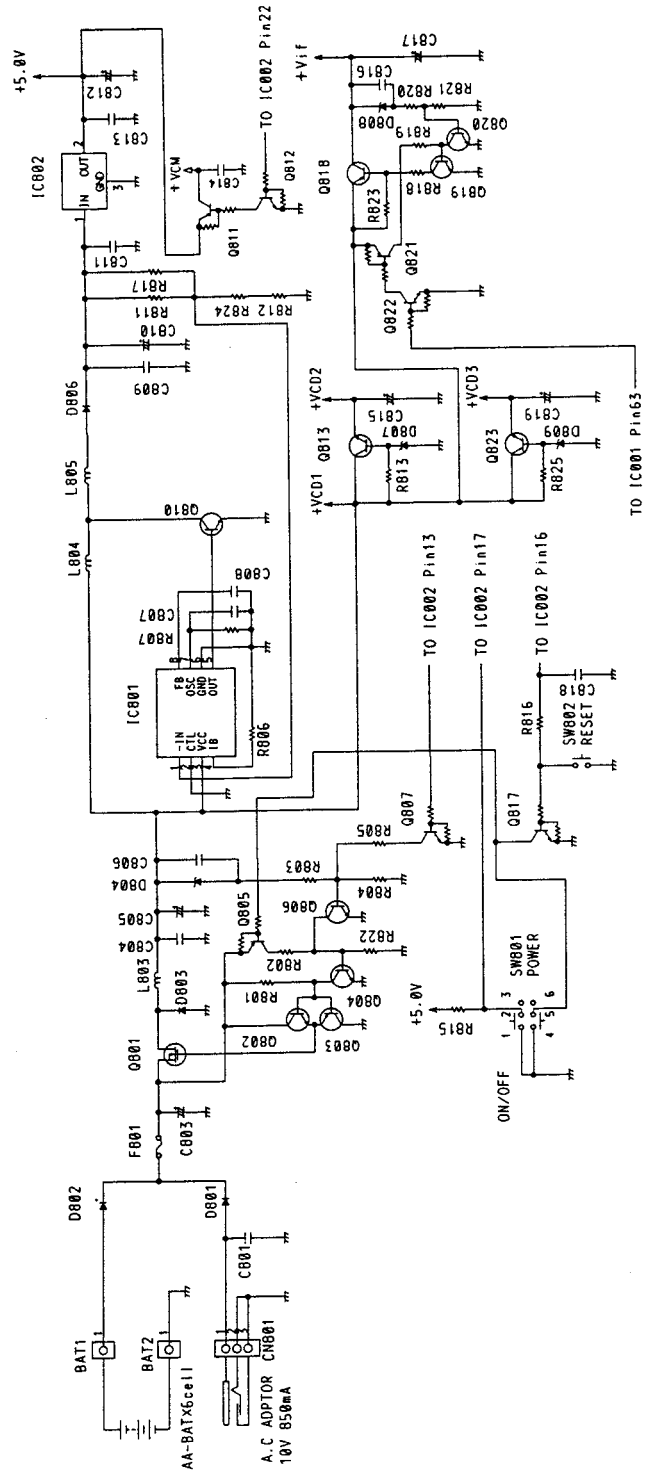
The voltage that is supplied by the AC adaptor is converted to about +6.8V (at AC adaptor) by the DC-TO-DC converter circuit. This circuit is composed of IC801, L804, L805, D806, D809, Q810, C807, C808, C809, C810, R806 and R842. The output voltage is fixed by R811 and R812, R817, R824. This +6.8Vdc (at AC adaptor) is regulated to +5V through the voltage regulator (IC802).

d) The +VCM Power Supply

The +VCM is supplied from +5V. The output voltage is controlled by the CPU (IC002 pin22).

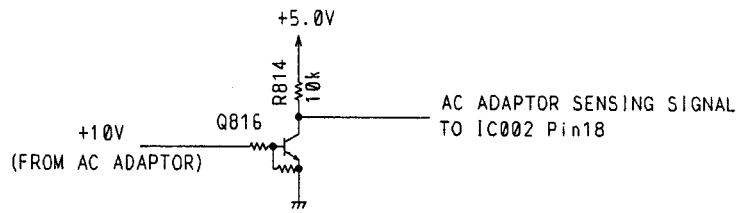
e) The +Vif Power Supply

The +Vif power supply is generated from +VCD1, which is decreased to about +5V. This circuit is composed of Q818, Q819, Q820, D808 and R820, R821. The output voltage is fixed by D808.



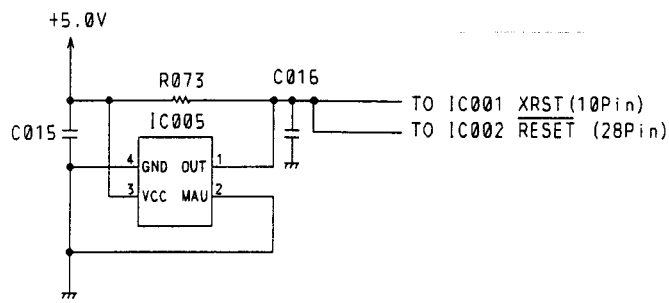
7.2.2 AC Adaptor Sensing Circuit

This circuit is used for detecting the AC adaptor.
When the AC adaptor is connected, transistor Q816 is turned on, and the CPU (IC002) detects the AC adaptor detecting signal ACON (L-level) at pin 18.



7.2.3 Reset Circuit

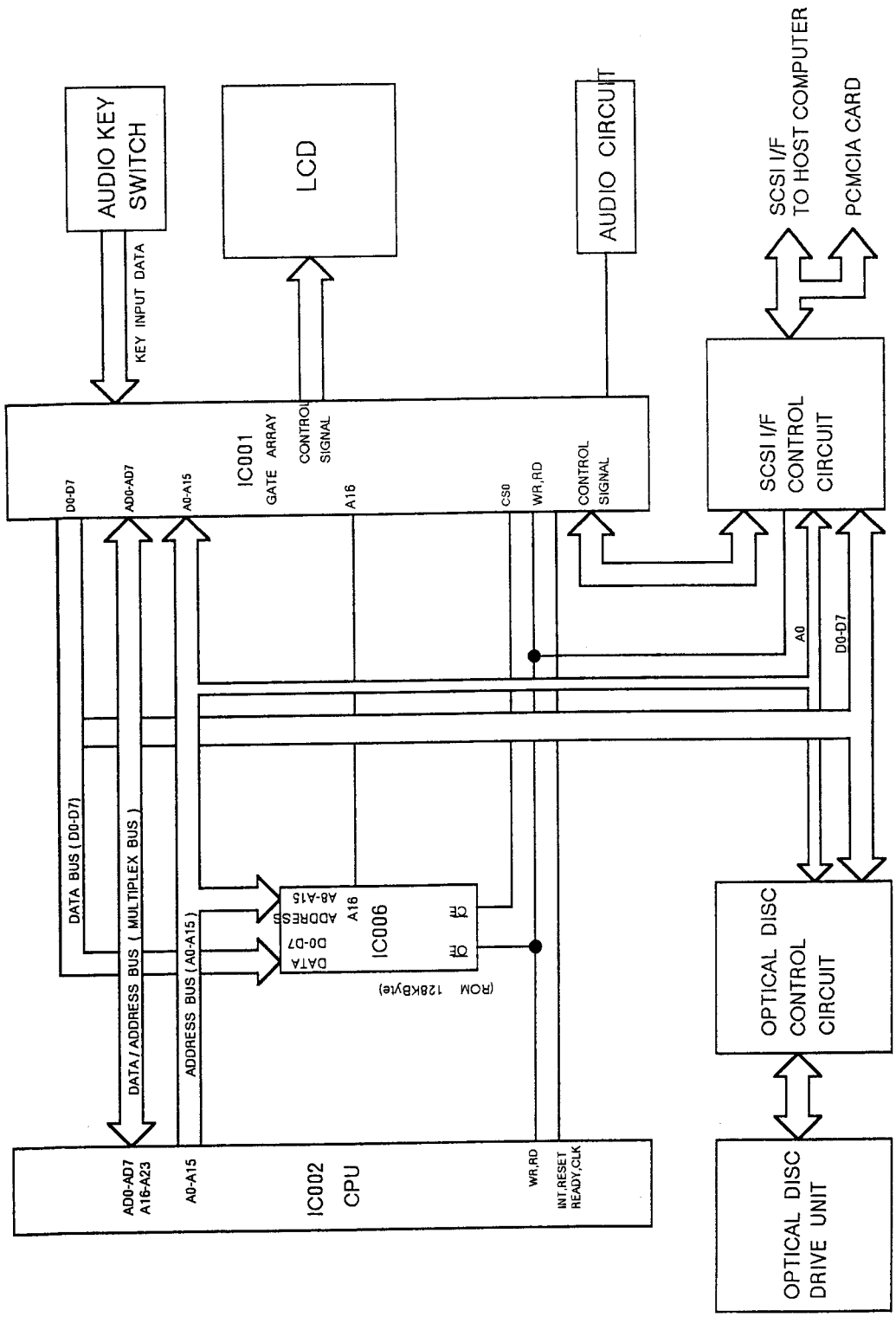
The reset signal is provided by the reset IC (IC005). When the +5V is supplied, the voltage at point Ⓐ rises. After the voltage exceeds +4.5V, a low level reset signal is provided for about 50msec. The reset time is determined by R073 and C016.



7.3 CPU and Control Circuit

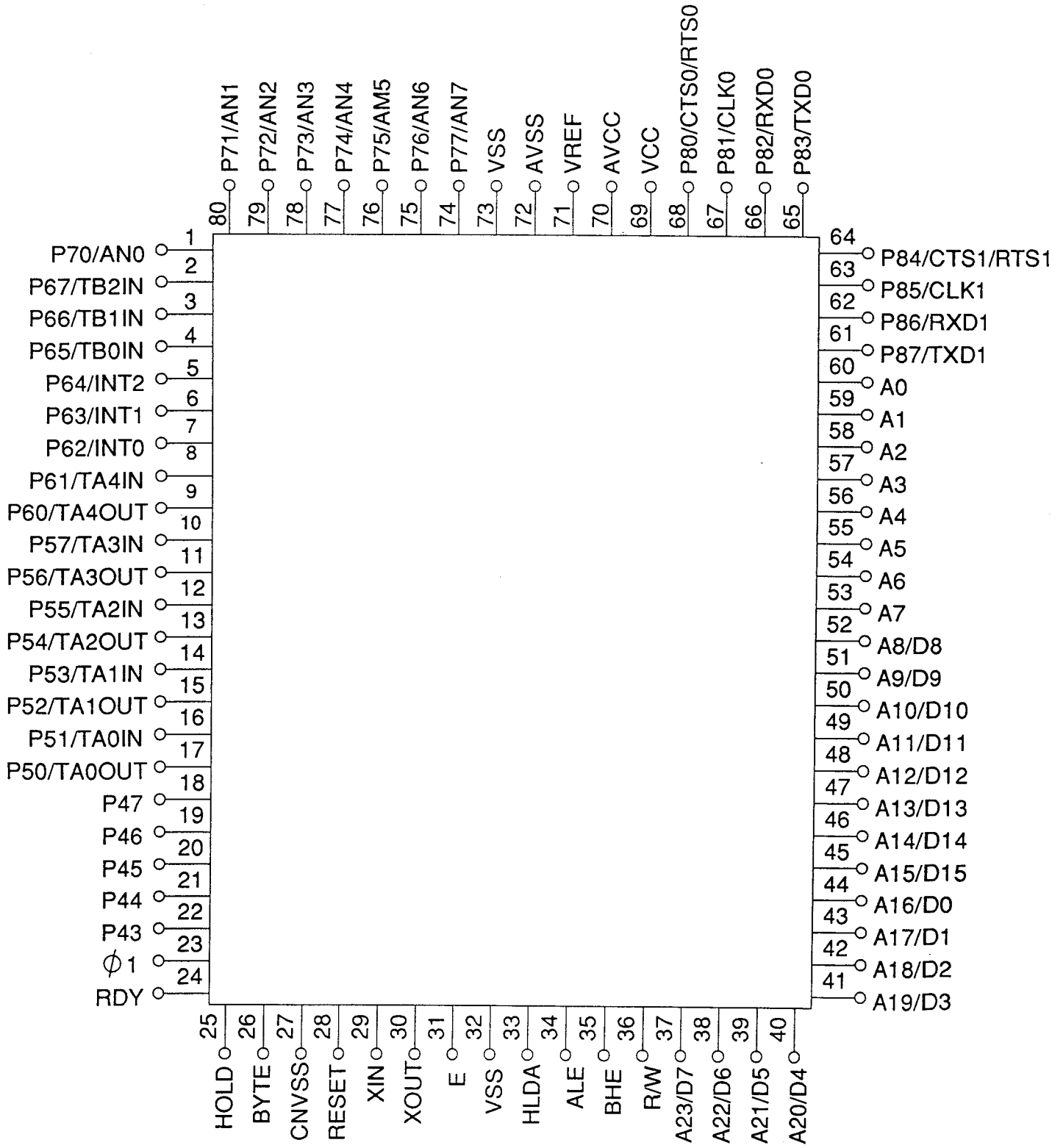
7.3.1 General Description

This block mainly consists of the CPU (IC002), ROM (IC006), gate array (IC001), RAM (IC004) IC, and a custom IC. It receives key data from the keyboard through the gate array and controls the optical disk drive, LCD and power supply.



7.3.2 CPU

This CD-ROM player is controlled by a M37732S4 microprocessor. The CPU controls the audio key scanning, the LCD, optical disc drive, power supply and memory management. The pin names and functions are shown in the following chart.



7.3.3 Memory Map and I/O Map

The CPU (IC002) can manage the memory area and the I/O area.
The memory map configuration is shown below.

Memory Map (320K byte)

Address	
00000 0007F	CPU Internal Special Function Register
00080 0087F	CPU Internal RAM Area
00880 0FFCF	Operating Program Area (IC1006)
0FFD0 0FFFF	Interrupt Table Area (IC1006)
10000 1FFFF	Not used
20000 2FFFF	I/0 Area CD-ROM Decoder (IC003)
30000 3FFFF	I/0 Area SCSI I/F (IC102)
40000 4FFFF	I/0 Area Gate Array In,Out Port (IC001)

Address	
000A	Power Supply Control/ Optical Disc Drive Control/ SCSI ID Control/ Battery Sensing
000B	
000E	
000F	
0012	
40000	LCD Control
40001	
40002	
40003	
40004	
40005	
40006	
4000B	Clock Control
4000C	Gate Array Out Port Control
4000D	Gate Array In Port Control

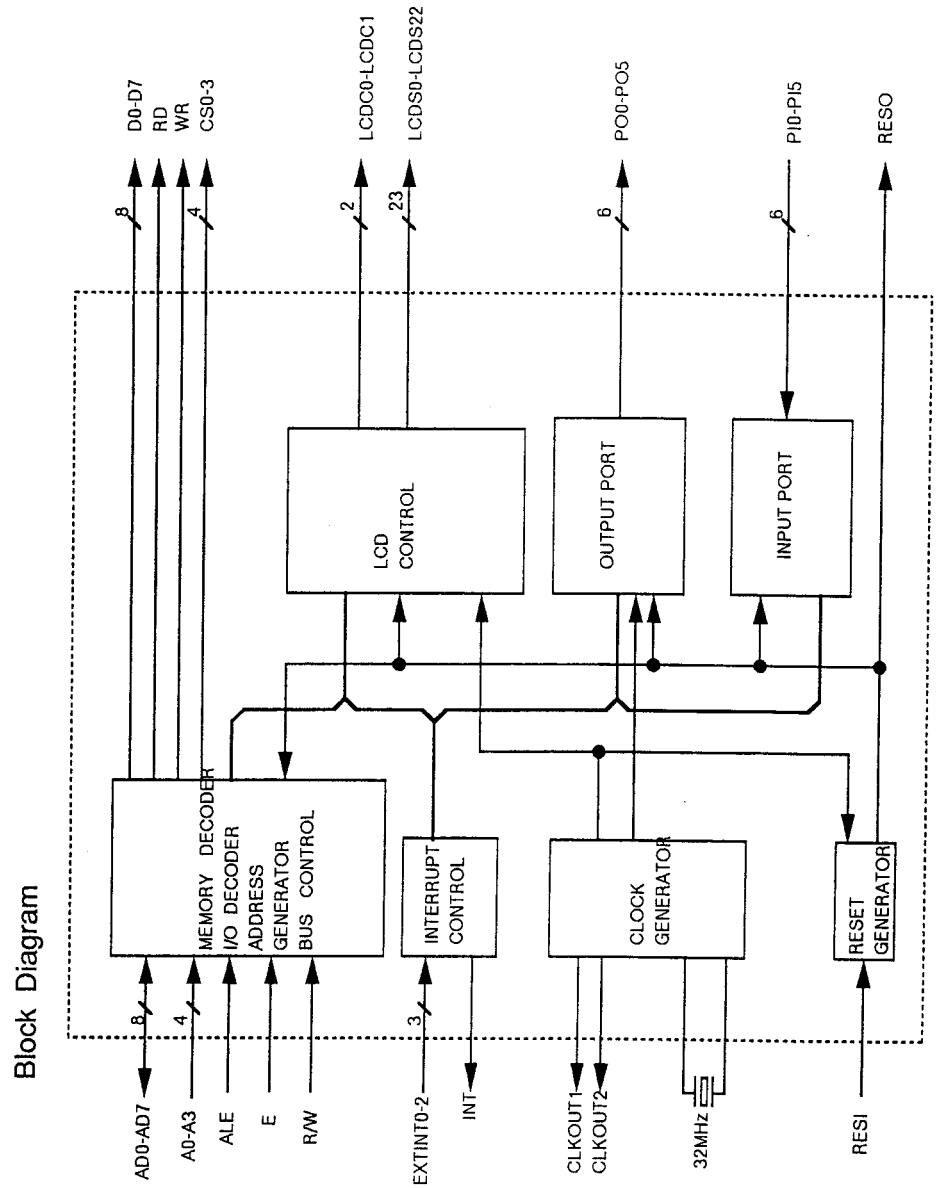
7.3.4 Gate Array

The gate array (IC001) is an original LSI which integrates complex circuits into one IC chip. Basically, the gate array consists of six circuits. The expansion input port is used to sense the audio key data and various conditions. The expansion output port is used to control the power supply and audio mute. The interface decoder is used to access other block circuits in the gate array, LCD and optical disc drive controller and SCSI I/F controller. The interrupt control circuit is not used.

7.3.5 Memory and I/O Select

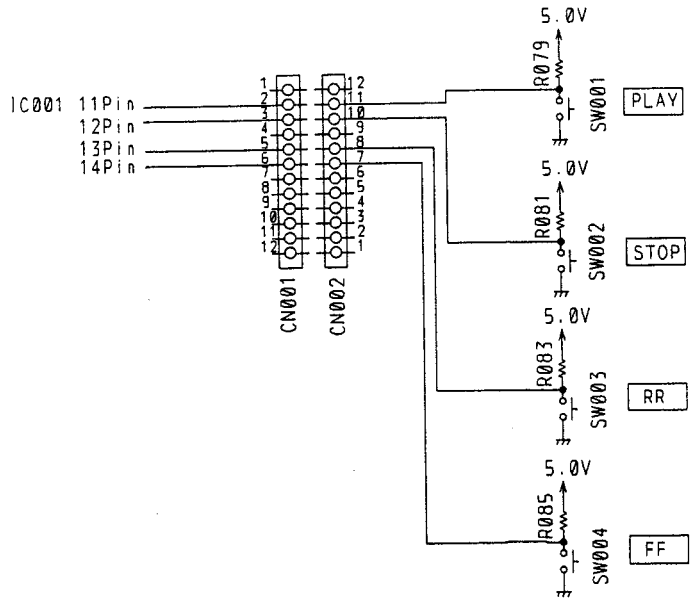
The gate array (IC001) has 4 chip select signals (CS0- CS3) that select the ROM (IC006), CD-ROM decoder (IC003), and SCSI controller (IC102). The chip select signal CS1 is not used. The memory and I/O select output signal is generated by the memory and I/O decoder and address generator which decode the address signals. When the CPU selects a memory or I/O chip, a low pulse signal is generated by the decoder, and a read or write operation is performed.

Block Diagram



7.4 Audio Key Circuit

The audio key is used for audio disc playing. This circuit consists of a key switch (SW001~SW003) and an expansion input port, which are located in the gate array.



7.5 Liquid Crystal Display

7.5.1 LCD General Construction

The LCD module is controlled by the gate array (IC001), which sends the segment data (S0~S22) and the scanning timing pulses (C0,C1).

7.5.2 Character Arrangement and Signal connection

The LCD character arrangement is as follows (FIG1,FIG2). The segment signal connection is shown in FIG-1.
The scanning timing pulses signal is shown in FIG-2.

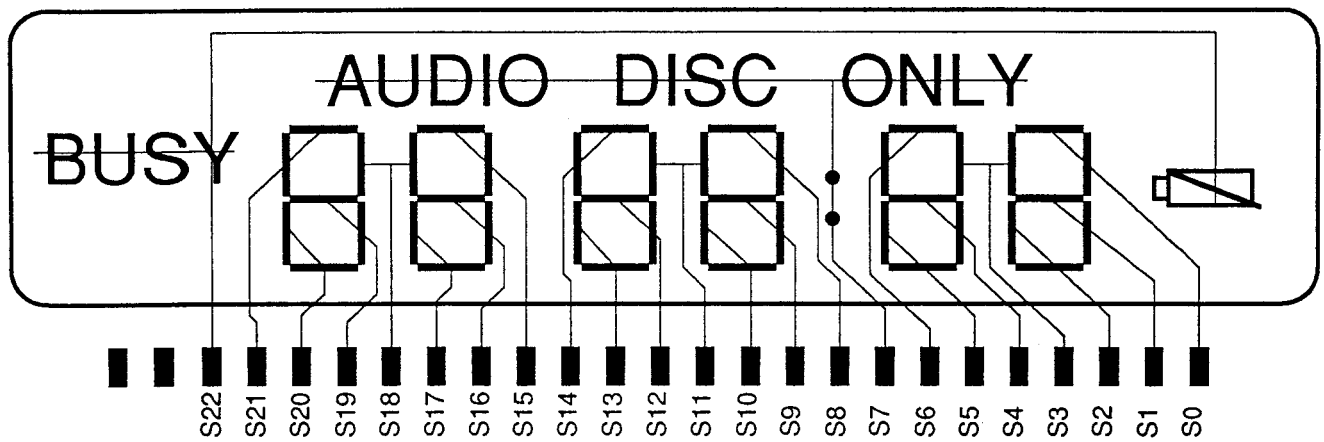


FIG-1

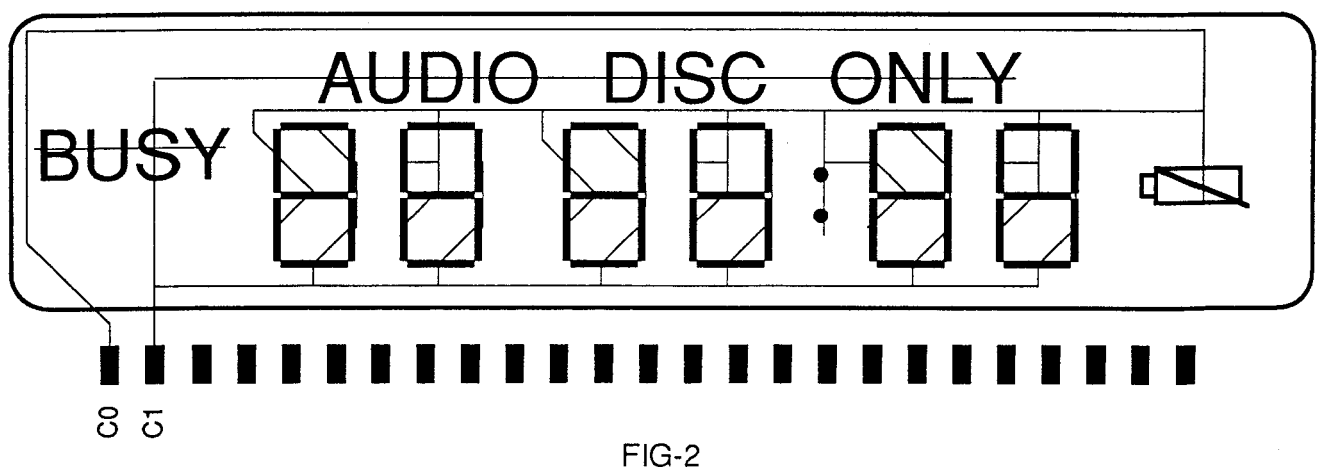
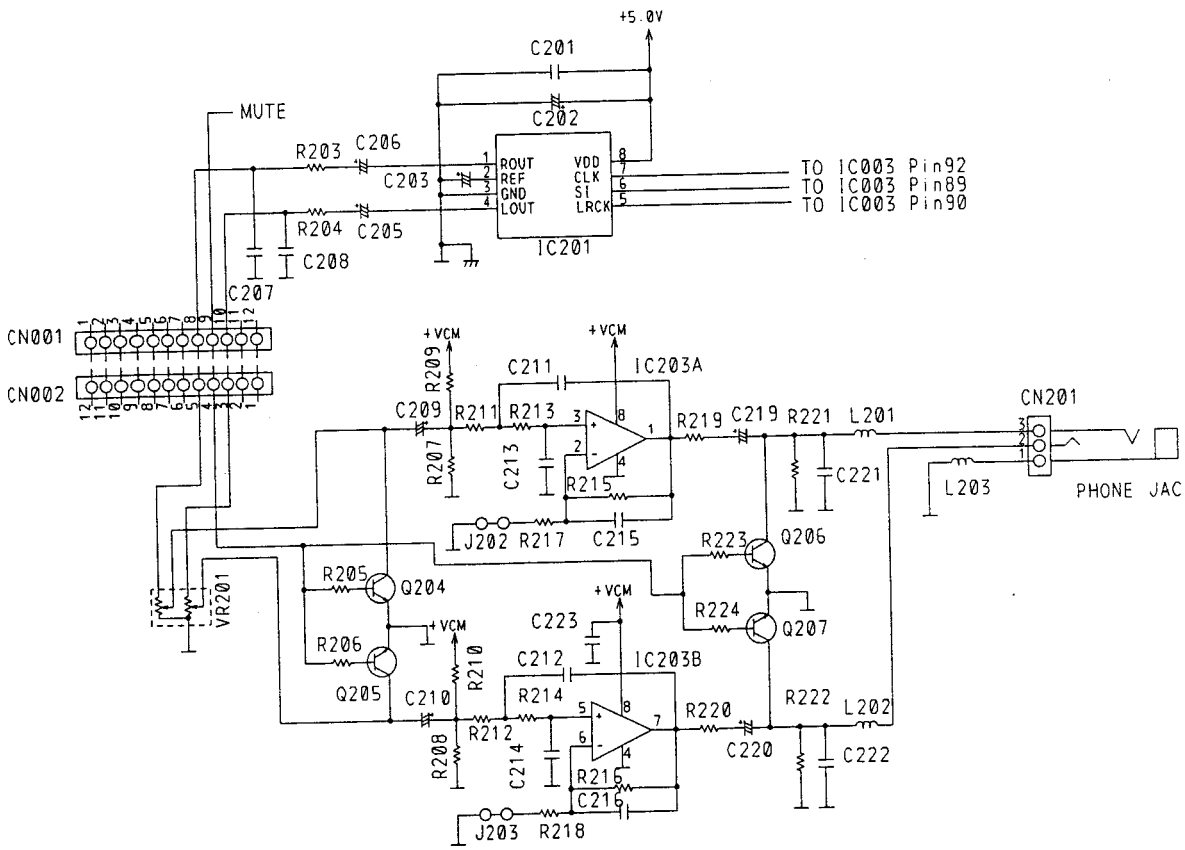


FIG-2

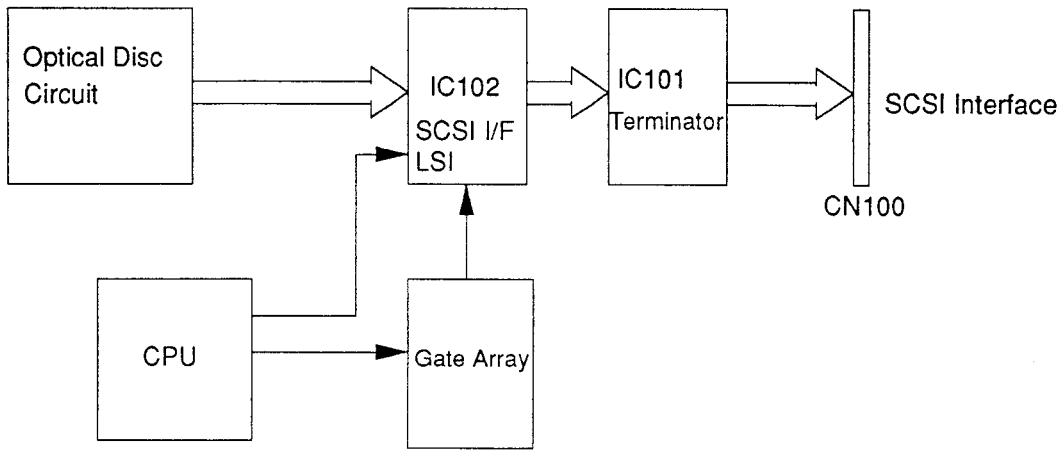
7.6 Audio Circuit

The audio circuit is composed of the D/A converter IC201, OP.AMP IC203, volume control VR201 and several resistors and capacitors. The one-bit serial data (DA), which is sent through the optical disc controller IC003 from the optical disc drive circuit, is inputted to the D/A converter IC201.
Then the D/A converter outputs the audio signal to the OP.AMP IC203.
The audio signal is supplied to the phone jack CN201 through the volume control VR201 after it is amplified by IC203.
This audio circuit is controlled by the CPU IC002 and gate array IC001. When pin 22 of IC002 is toggles to H-level from L-level, Q811 and Q812 are turned on, activating this circuit.
Also, the transistor Q203 is used for muting the electrical noise, caused in this circuit as Q811 is turned. When Q813 is turned on, Q203 receives the H-level MUTE signal from pin 67 of IC001 for a short time and turn on the transistors Q204 ~ 207 to mute the electrical noise.



7.7 SCSI Interface Circuit

This circuit consists of IC101, IC102 and CN100. It is controlled by CPU IC002 through the gate array (IC001) and is used to send the CD-ROM data to the host computer from the optical disc drive circuit.

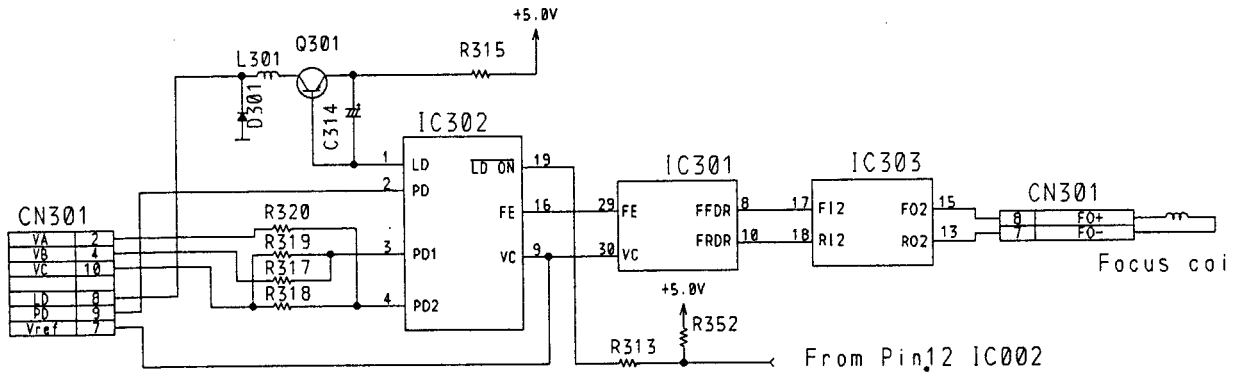


7.8 Optical Disc Drive Circuit

This circuit consists of IC301, IC302, IC303, optical pickup, traverse motor and home position detecting switch.
This circuit, controlled by ICs 301~303, is used to read data on the compact disc.

a) Focus control

The astigmatic method is used to focus the laser beam on the compact disc surface.
When the signal LD ON (pin 19 of IC302) toggles to a L-level and pin 6 of IC302 becomes a H-level, transistor Q301 is turned on, emitting the laser beam. The beam is reflected by the compact disc surface and strikes the laser beam detector through the pickup lens. The laser beam detector sends three beam sensing signals (VA,VB,VC) to IC302. The sensing signals (VA,VC) are sent to pin 4 of IC302. The sensing signals (VB,VC) are sent to pin 3 of IC1302. The IC302 operates (VB+VC) - (VA+VC) and generates the Focus Error Signal (FE), which is sent to IC301 through pin 16 of IC302 to adjust the amplitude level of this signal. Also, the FE signal is amplified by the OP.AMP in IC302 and sent to pin 17 and 18 of IC303 through pin 8 and 10 (IC302). And, IC303 supplies the electric current to the focus coil from pin 13 or 15 to the up-and-down the pickup lens.

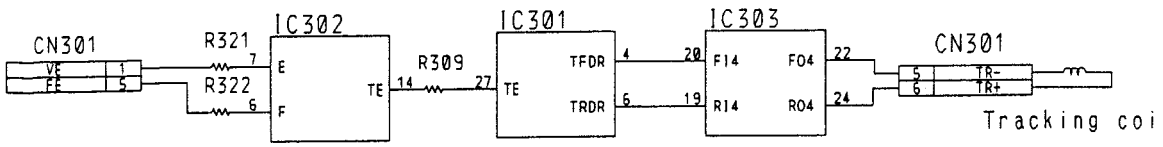


b) Tracking Control Circuit

The three spots method is used for what the laser beam accurately trace the track on the compact disc. This circuit has mainly the tracking balance function for focusing the laser beam to the track on the disc.

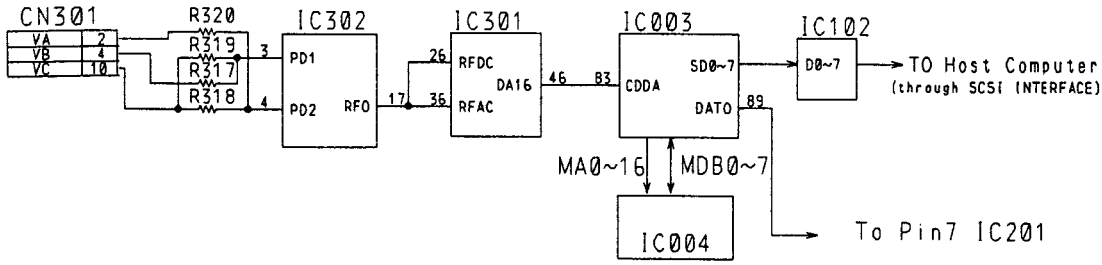
Tracking control

Integrated circuit IC302 receives 2 tracking signals (VE,VF) from pin 1 and pin 5 of connector CN301 to control (VE-VF). The resulting signal at pin 14 of IC302 is the TE signal. This signal is sent to IC303 through pin 27 of IC301, and the amplitude level of this signal is adjusted. Also, the TE signal is amplified by OP.AMP in the IC301 and sent to pin 19 and 20 of IC303 through pin 4 and 6 (IC301). IC303 supplies the electric current from pin 22 or 24 to the tracking coil. As a result, the pickup lens moves left and right to focus the laser beam on the track.



c) Data Reading Process

The 3 sensing signals (VA,VB,VC) are added by IC302, and the resulting signal is sent to pin 26 of IC301 through pin 17 of IC302. At IC301, the A/D converting, modulating, error checking and error correcting of the data are performed.
If the data is an audio data, it is sent to the audio circuit (IC201) from pin 46 of IC301 through IC003.
If the data is ROM data, it is separated as character data, audio data, etc. by IC004 and IC003.
These separated data signals are sent to the host computer through IC102 and SCSI interface .



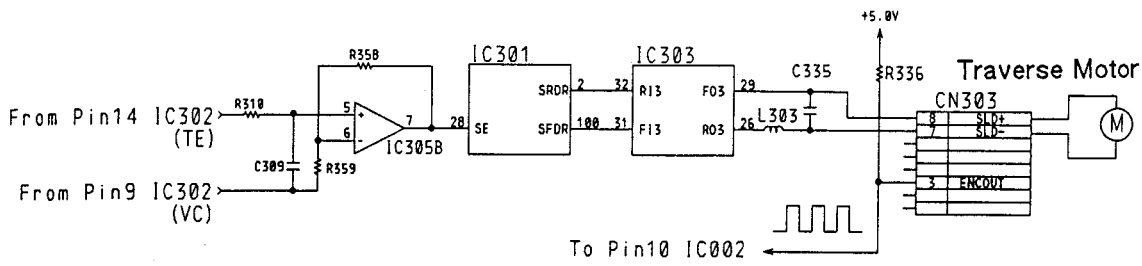
d) Traverse Motor Drive Circuit

When the laser beam traces the track continuously :

The rotation of the traverse motor is controlled by the SRDR signal (pin 2, IC301) or SFDR signal (pin 100, IC302). The TE signal is sent to L.P.F (R310, C309) and is amplified by OP.AMP (IC305B). The output signal of OP.AMP is the SE signal. When the SE signal is sent to pin 28 of IC301, SRDR and SFDR are sent to pin 31, 32 of IC303. IC303 sends the motor drive current from pin 26 or 29 to the traverse motor.

When stepping the laser beam from the current track to another track :

The pulse signal which is proportional to the number of revolutions made by the encoder of the traverse motor and the photosensor is used to determine the distance of track jump.

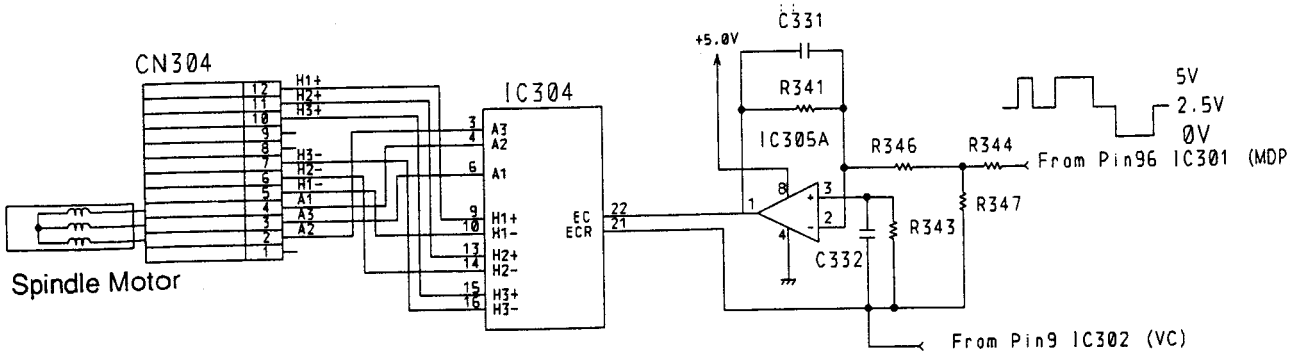


e) Spindle Motor Control Circuit

A brushlessmotor is used for the spindle, which rotates the compact disc. The rotation of the compact disc is maintained at a constant linear velocity (1.2~1.4m / sec) by the spindle motor control circuit.
This section consists of hall element, IC304 (spindle motor driver IC), IC305 (OP.AMP) and IC301.

(1) driving system
The hall signal from the hall element is sent to pins 9,10,13,14,15,16 of IC304 through CN304. These signals are converted to a current in phase by IC304. These signals are sent to the spindle motor coil from pins 3, 4 and 6 of IC304 through pins 2, 3 and 4 of CN304 .

(2) torque control
The drive pulse signal (MDP pin 96) is sent to IC305, R341, and C331. A DC voltage signal is generated by this circuit and sent to pin 22 of IC304. If it is bigger than the standard voltage (2.5V pin 21 of IC304), the spindle motor rotates clockwise. If it is smaller than the standard voltage, it rotates counterclockwise.



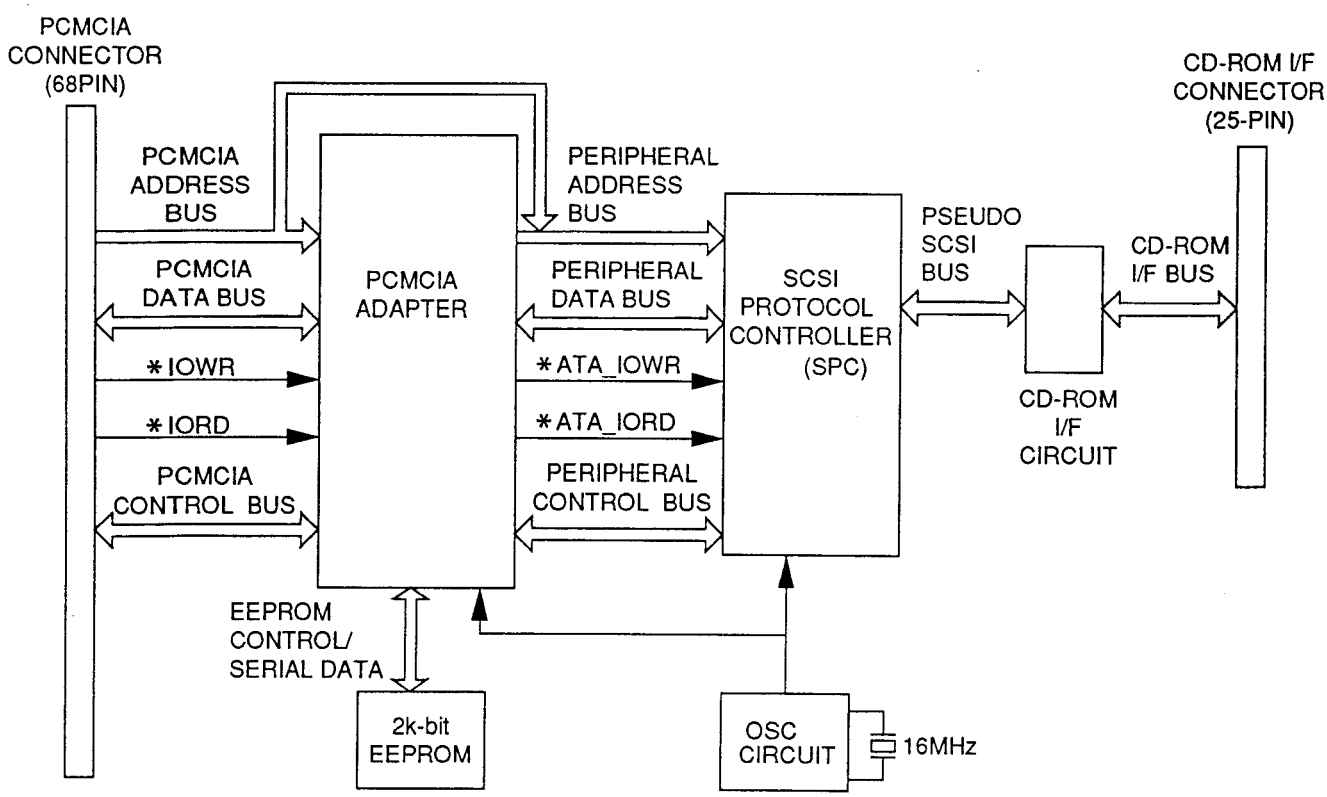
7.9 General Explanation of PCMCIA Card

This PCMCIA card is based on the PCMCIA 2.01 TYPE II industry standards. It is used to connect the KXL-D720 CD-ROM player to a wide range of personal computers that are equipped with a PCMCIA slot, such as Subnote PCs.

The card is mainly comprised of a PCMCIA adapter, SCSI protocol controller, oscillator circuit, EEPROM for storage of attribute information, and CD-ROM I/F circuit. The PCMCIA adapter contains a 256-Byte Attribute Memory, PCMCIA configuration registers, and an EEPROM sequencer circuit for program loading from EEPROM. After the card is placed into the PCMCIA slot of the host computer, the Ready/Busy signal on the PCMCIA connector is set to "Busy" through IRQ pin. PCMCIA Adapter internal sequencer starts up and loads the registers data and attribute data from EEPROM. After the completion of loading all data, "Ready" signal is asserted on PCMCIA connector through IRQ.

Enabler software on the host computer reads and recognizes the attribute information and configures this card as an I/O card with internal PCMCIA configuration registers. Once the card is configured, the I/O window is opened on the PCMCIA slot, then it enables the host computer to access the SCSI protocol controller through this window.

The SCSI protocol controller (SPC) consists of internal control registers, 16 Byte FIFO, and high-speed data transfer logic. The SPC controls all high-speed data transfer between the host computer and the KXL-D720 CD-ROM player. The SPC receives commands from the host computer and controls pseudo SCSI signals and drives the CD-ROM I/F bus through the CD-ROM I/F connector.



8. Adjustment

Caution

To prevent damage to the traverse deck, please read Section 2, Handling Precautions for Traverse Deck before performing this adjustment.

8.1 Adjustment and Check Items

Item	Adjustment Standard & Description
Check of Vref Voltage	Make sure that the Voltage between Vc and GND is + 2.5 ± 0.15 V.
Focus Offset Adjustment	To align the center of the FE amplitude with the voltage line of Vc (GND-Vc) on the oscilloscope screen.
Tracking Balance Adjustment	TE amplitude is to be symmetrical at voltage line of Vc on the oscilloscope screen.
Check of the RF Amplitude Level	Make sure that the RF amplitude level is about 1.0 Vpp. Make sure that the shape (◊) of the eye-pattern, generated on the center part of the waveform, is sharp.

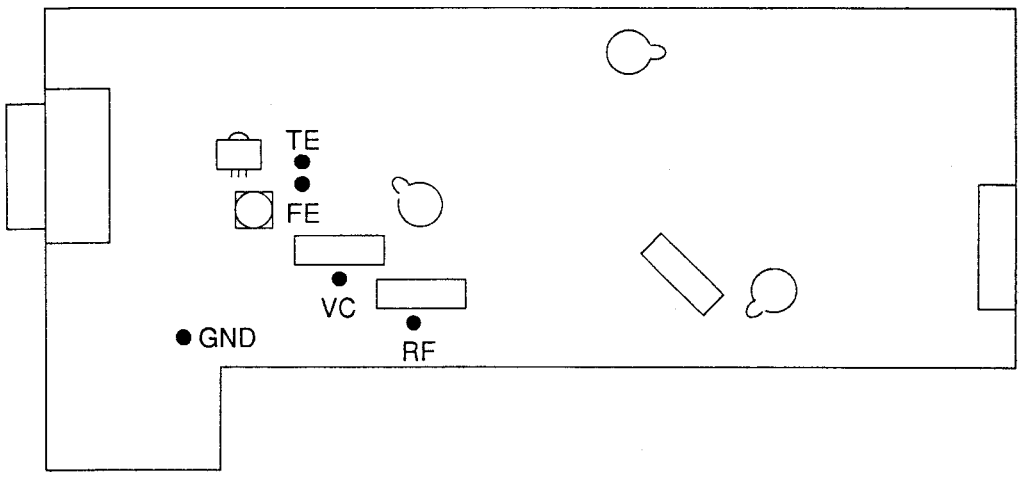
8.2 Instruments used

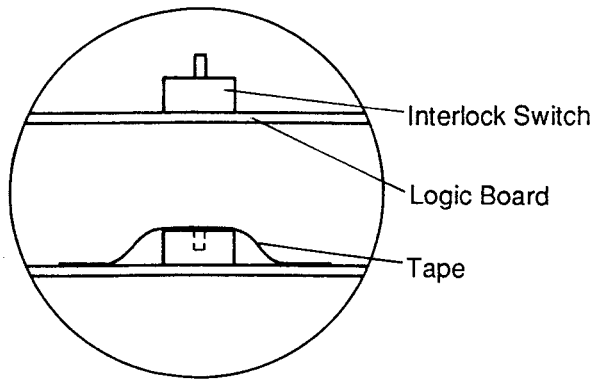
Tool Name	Part Number	Quantity	Description
Oscilloscope	-------	1	Requiring Range is 2MHz.
Lead Wires	-------	5	5 Lead Wires. (min. length 5cm)
Driver	-------	1	This driver must be an isolation type.
Compact Disc	-------	1	Standard Compact Disc
AC Adaptor	-------	1	Use only the AC Adaptor that is appropriate for this model.
Main Logic Board	-------	1	
Sub Board	-------	1	
Drive Unit	-------	1	

8.3 Adjustment Preparation Work

1) Soldering the lead wires

Solder the 5 lead wires to Vc, TE, FE, RF and GND on the main board as shown below.





2) Safety Interlock Switch

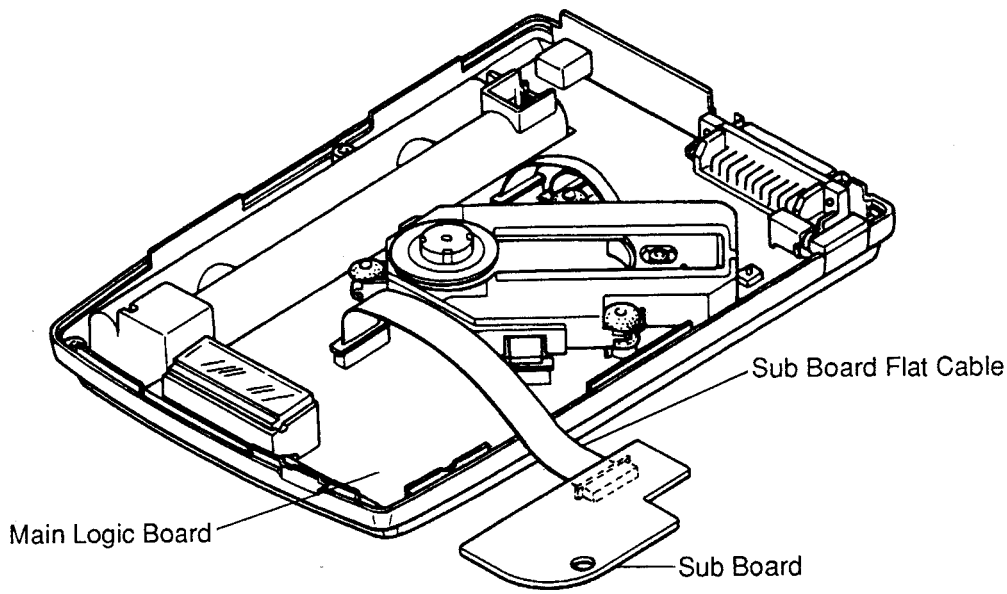
Use adhesive tape to defeat the safety interlock switch.

3) Setting up the unit for adjustment

Connect the sub board flat cable to the connector on the main logic board (see the Figure-1.).

4) Insert a standard compact disc.

(Figure-1)



8.4 Setting the Adjustment Mode

The focus offset adjustment and the tracking balance adjustment are performed in the Adjustment Mode. Adjustment Mode is set by the following Key Operation.

The SCSI ID No is 2. Turn on the power while pressing the FF, RR and STOP Keys.
The following message is displayed :

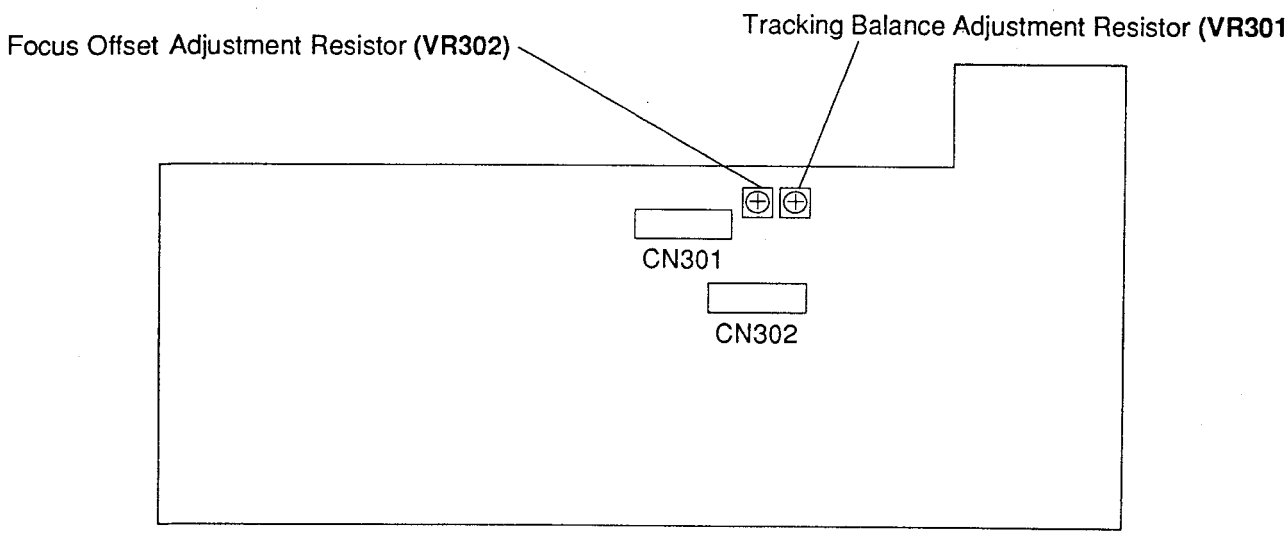
CP 2

8.5 Checking the Vc Voltage

Before performing the focus offset and tracking balance adjustments, make sure that the voltage between Vc and GND is +2.5 ± 0.15 V. If this voltage is incorrect, check pin 9 of IC302.

8.6 Adjustment

8.6.1 Adjustment Variable Resistor



8.6.2 Focus Offset Adjustment

Connect the Vc lead wire to the ground terminal of the oscilloscope and the FE lead wire to the probe terminal. To enter the Focus Offset Adjustment Mode, press the Play Key. The following message is displayed :

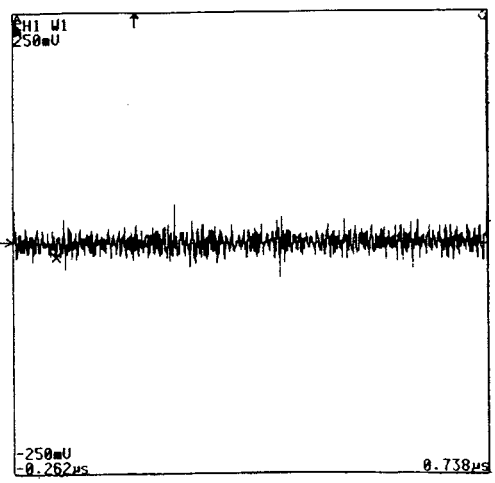
c FE

While observing the waveform between FE and Vc, adjust the variable focus offset resistor VR302 on the main board. When adjusting VR302, use the isolation driver to get an accurate waveform.

Oscilloscope Adjustment	Align the input GND level with the horizontal center line of the oscilloscope before performing this adjustment.
Input	DC Coupling Input Range : 500mV/div or Less
Time Scale	2 msec/div
Trigger	DC Coupling
Adjustment Standard	Align the center of FE amplitude with the voltage line of Vc (GND-Vc).

Digital Oscilloscope

Align the center of FE amplitude with the horizontal center line of the oscilloscope.



— Horizontal Center Line

8.6.3 Tracking Balance Adjustment

The drive must be in the tracking balance mode to perform the adjustment. Press the Play Key. The following message is displayed.

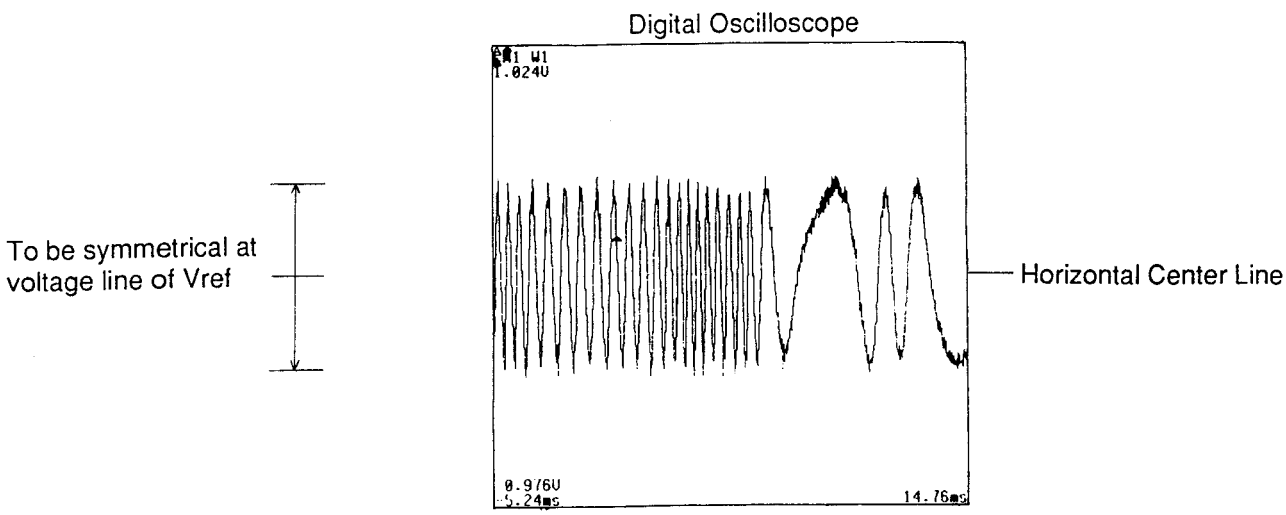
c 7E

When performing the adjustment, do not touch a key. If you press any key, another mode is set.

Connect the Vc lead wire to the ground terminal of the oscilloscope and the TE lead wire to the probe terminal. While observing the waveform between TE and Vc, adjust the variable tracking balance resistor VR301 on the main board. When adjusting VR301, use the isolation driver to obtain an accurate waveform.

Oscilloscope Adjustment	Align the input GND level with the horizontal center line of the Oscilloscope before performing this adjustment.
Input	DC Coupling Input Range : 500mV/div or Less
Time Scale	2 msec/div
Trigger	DC Coupling
Adjustment Standard	TE amplitude is to be symmetrical at voltage line of Vref. Make sure that the TE amplitude level is about 800 mV. If this level is 400 mV or less, the disc is dirty or the traverse deck is no good. Recheck it using a clean disc.

Digital Oscilloscope



8.6.4 Check of the RF Amplitude Level

The drive must be in the "Check of the RF Amplitude" Mode to perform this adjustment. Press Play Key once. The following message is displayed:

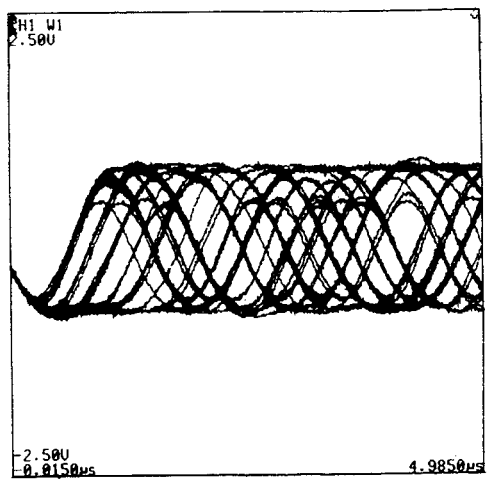
c RF

When performing the adjustment, do not touch a key. If you press Play key, the "c FE" is called. And, when exiting the adjustment Mode, Press Play key twice .

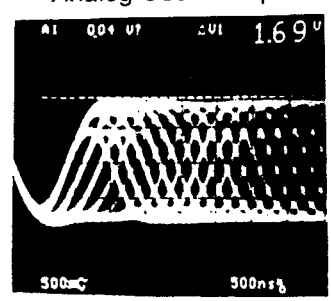
Connect the Vc lead wire to the ground terminal of the oscilloscope and the RF lead wire to the probe terminal. By observing the waveform between RF and Vc, make sure that the RF amplitude level is about 1.1 Vpp and the shape (◊) of the Eye-Pattern, generated on the center part of the waveform, is a sharp.

Oscilloscope Adjustment	Align the input GND level with the horizontal center line of the Oscilloscope before performing this adjustment.
Input	DC Coupling Input Range : 500mV/div or Less
Time Scale	500 nsec/div
Trigger	AC Coupling
Adjustment Standard	Make sure that the RF amplitude level is about 1.0 Vpp. If this level is 0.7 Vpp or less, the disc is dirty or the traverse deck is no good. Recheck it using a clean disc. Further, make sure that the shape (◊) of the eye-pattern, generated on the center part of the waveform, is sharp.

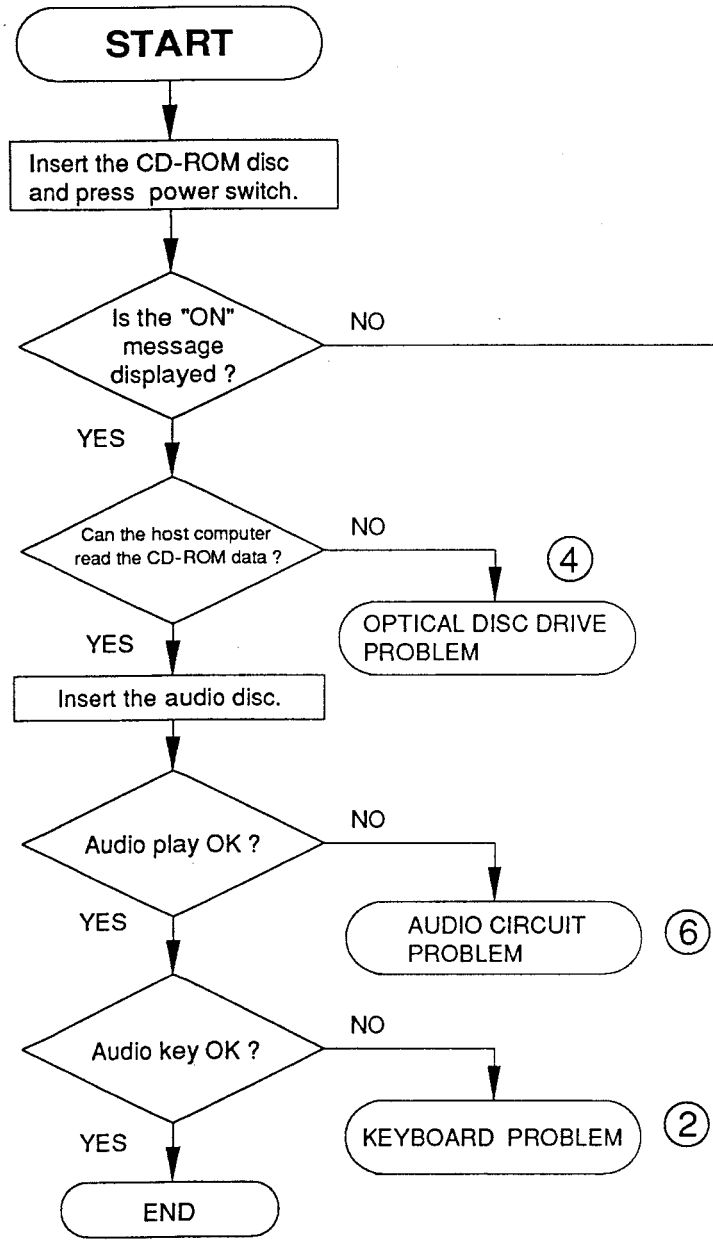
Digital Oscilloscope



Analog Oscilloscope



9. Troubleshooting



Note :
Check the following movement while pushing the safety interlock switch.

Movement of the traverse deck :

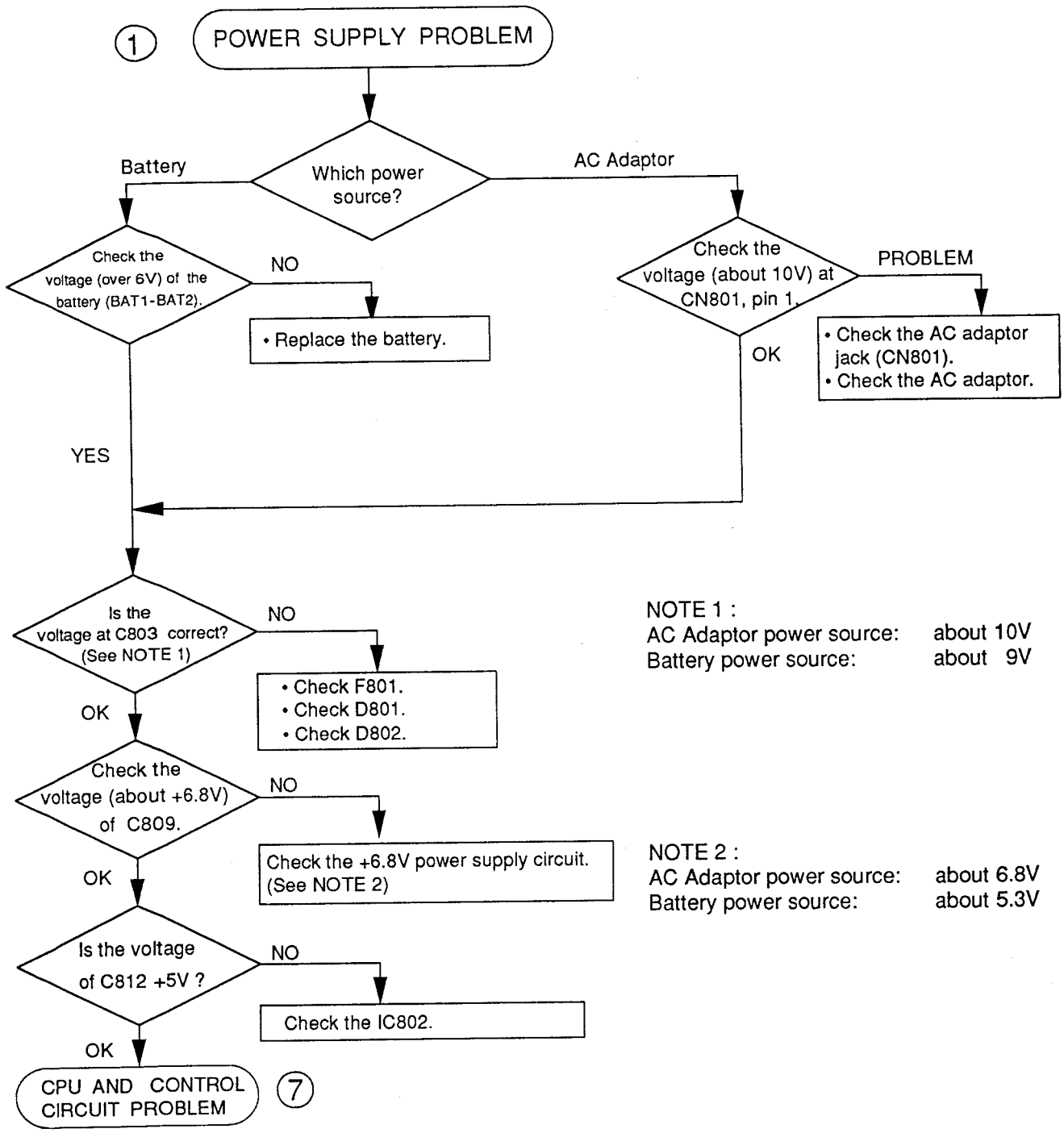
Note :
When turning on the power after moving the traverse deck to the rear, the traverse deck must return to the home position smoothly.

Movement of the pickup lens :

After returning the traverse deck to the home position, the pickup lens must move up and down several times.

Movement of the spindle motor :

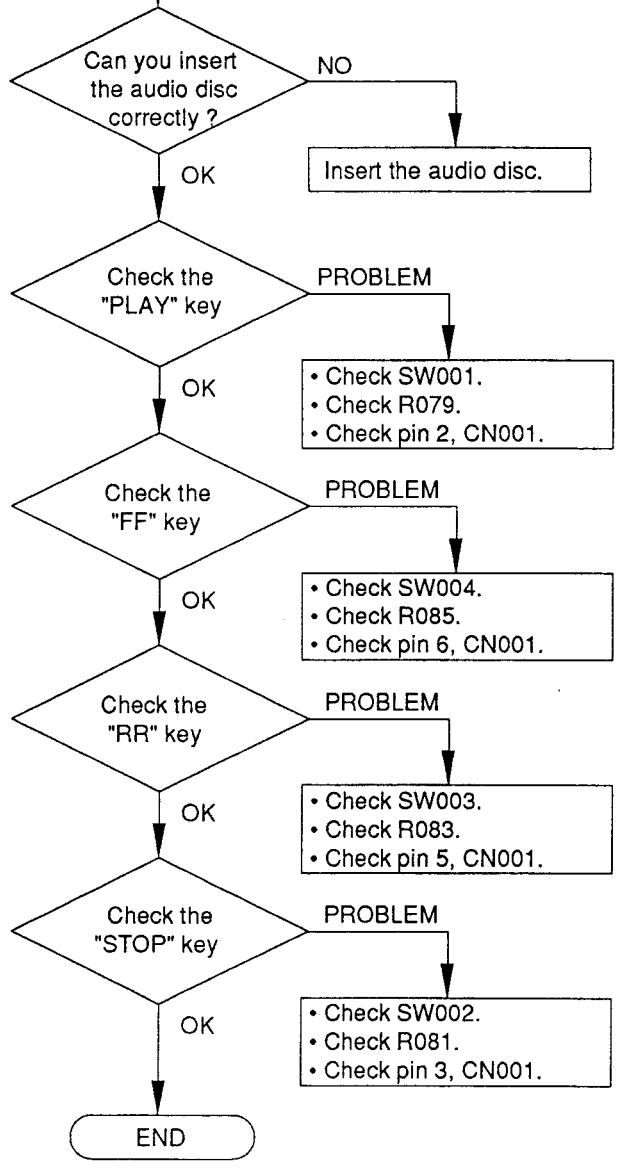
After finishing the pickup lens initial movement, the spindle motor must turn in the clockwise direction.



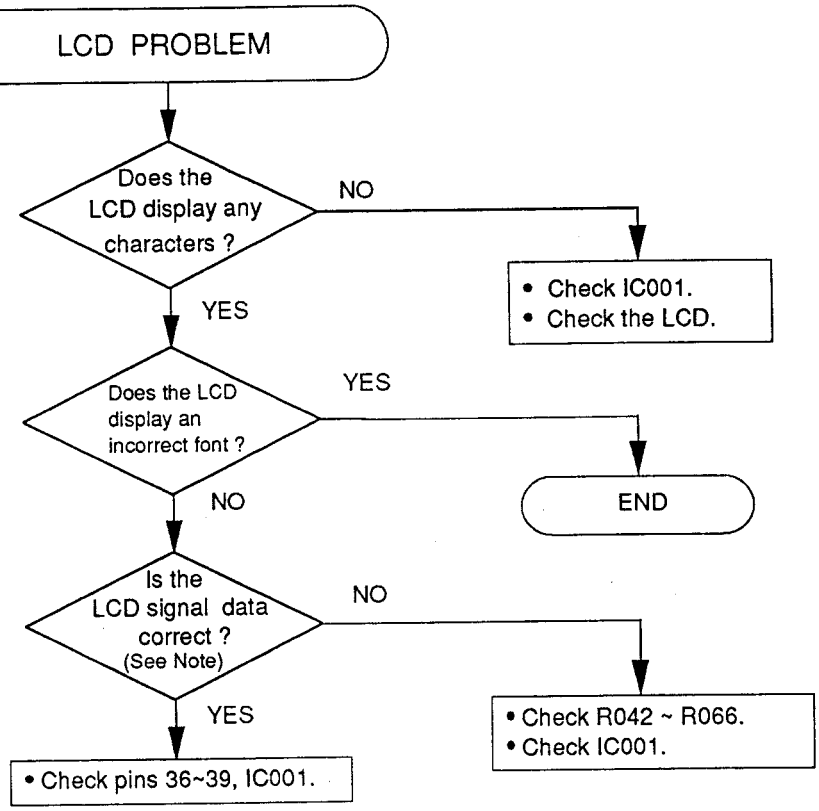
NOTE 1 :
AC Adaptor power source: about 10V
Battery power source: about 9V

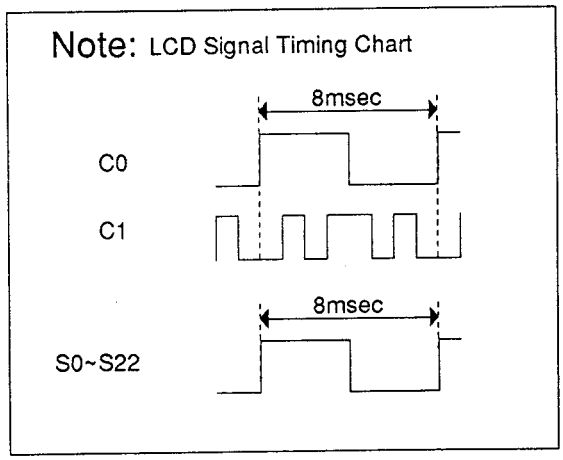
NOTE 2 :
AC Adaptor power source: about 6.8V
Battery power source: about 5.3V

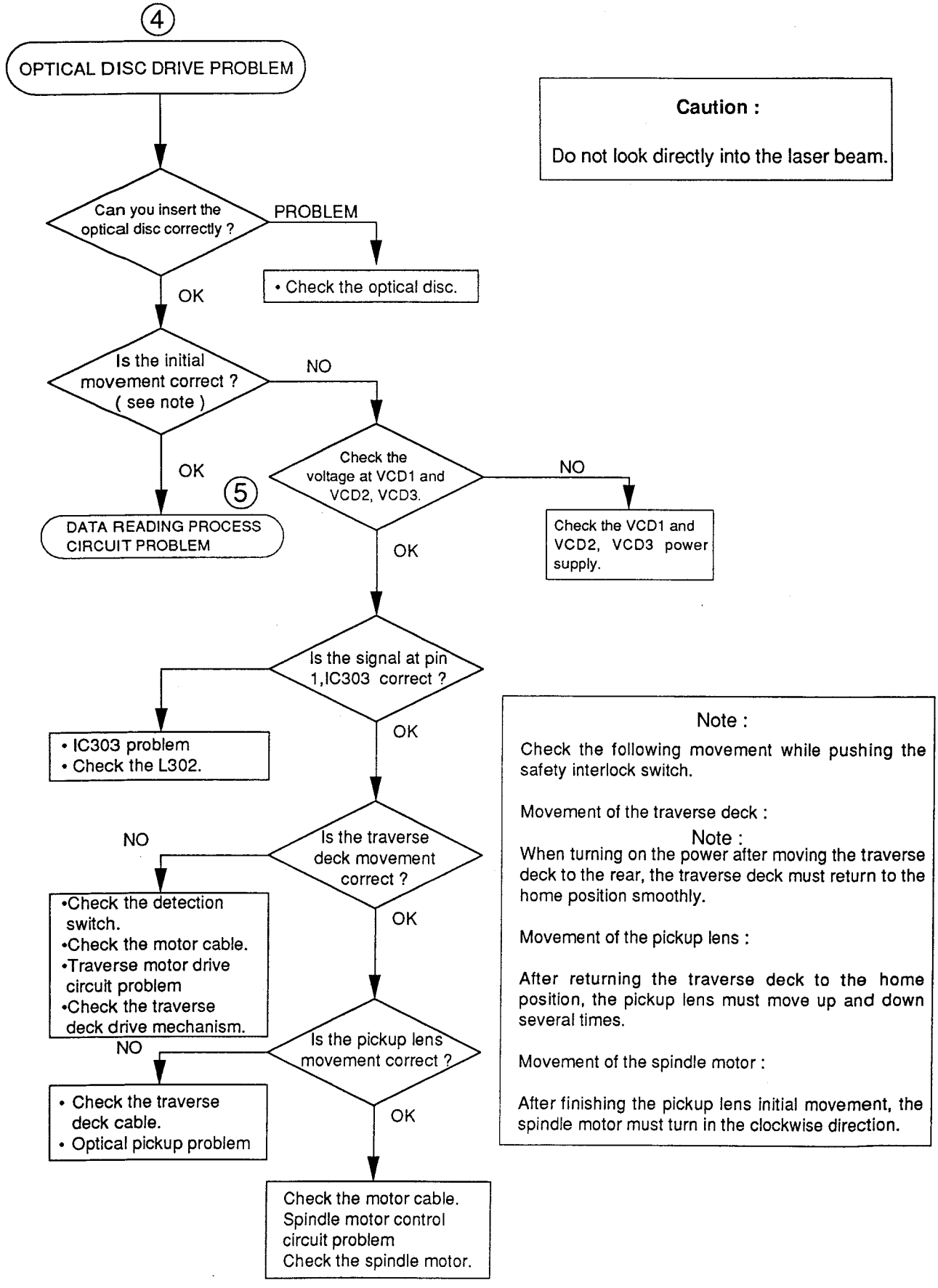
② KEYBOARD PROBLEM



③


LCD PROBLEM
Does the LCD display any characters ?
NO
• Check IC001.
• Check the LCD.
YES
Does the LCD display an incorrect font ?
YES
END
NO
Is the LCD signal data correct ? (See Note)
NO
• Check R042 ~ R066.
• Check IC001.
YES
• Check pins 36~39, IC001.


Note: LCD Signal Timing Chart
8msec
C0
C1
8msec
S0~S22



Caution :

Do not look directly into the laser beam.

Note :

Check the following movement while pushing the safety interlock switch.

Movement of the traverse deck :

Note :

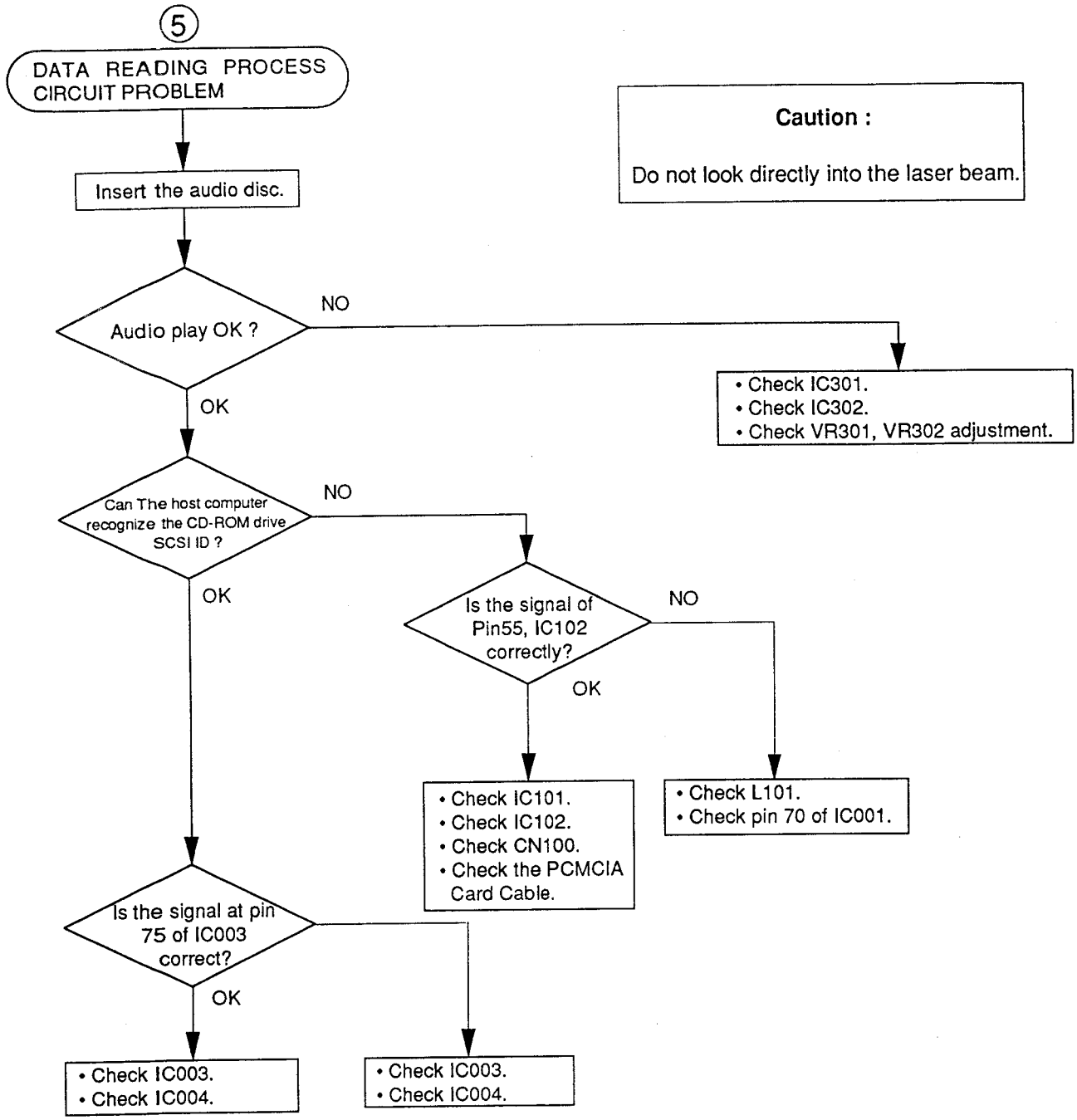
When turning on the power after moving the traverse deck to the rear, the traverse deck must return to the home position smoothly.

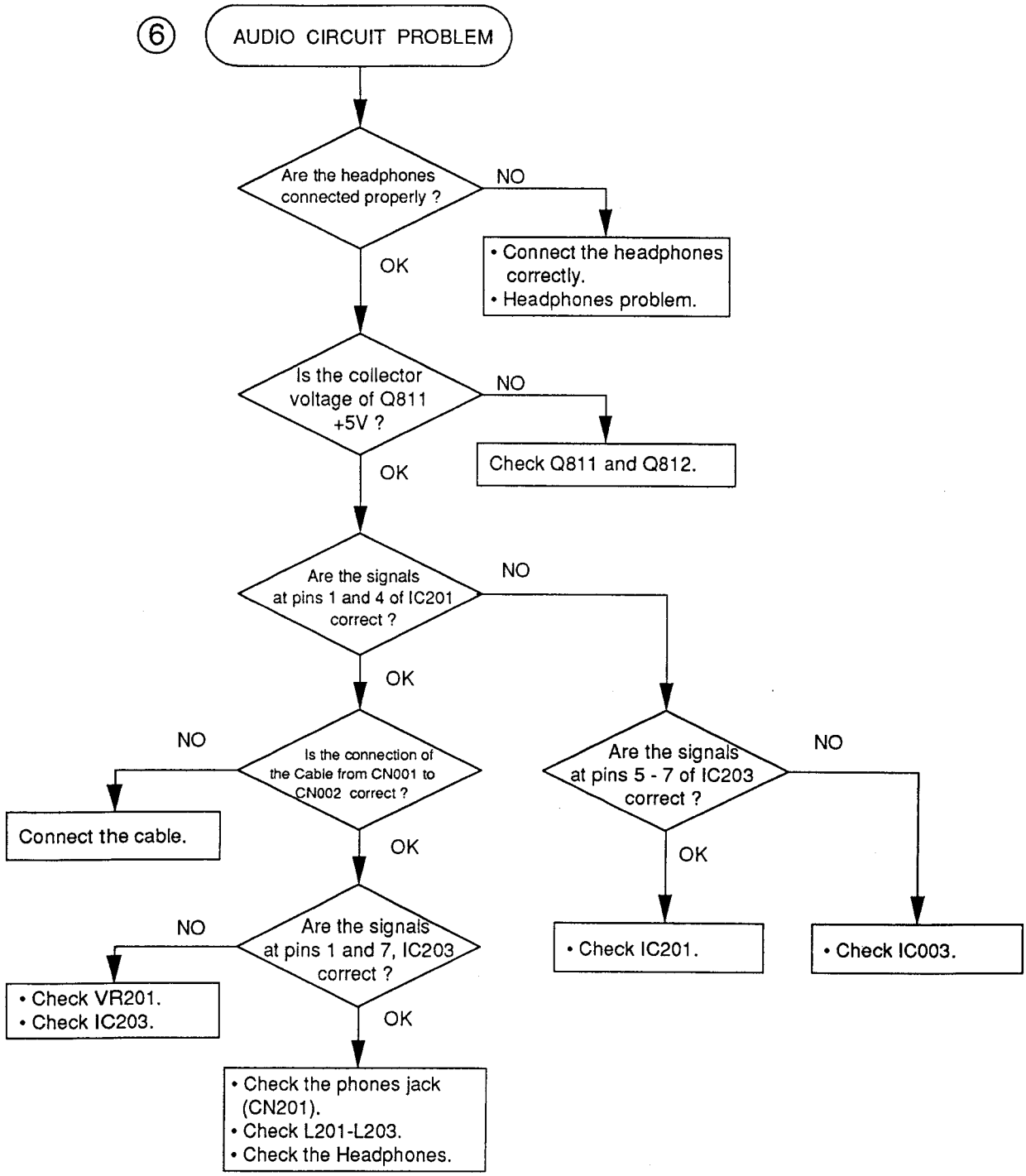
Movement of the pickup lens :

After returning the traverse deck to the home position, the pickup lens must move up and down several times.

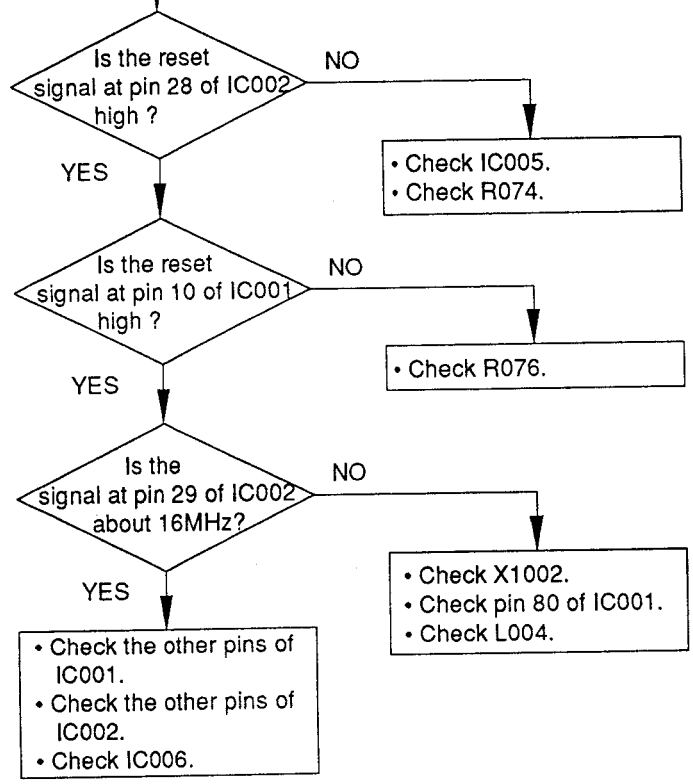
Movement of the spindle motor :

After finishing the pickup lens initial movement, the spindle motor must turn in the clockwise direction.


5
DATA READING PROCESS CIRCUIT PROBLEM
Caution :
Do not look directly into the laser beam.
Insert the audio disc.
Audio play OK ?
NO
OK
• Check IC301.
• Check IC302.
• Check VR301, VR302 adjustment.
Can The host computer recognize the CD-ROM drive SCSI ID ?
NO
OK
Is the signal of Pin55, IC102 correctly?
NO
OK
• Check IC101.
• Check IC102.
• Check CN100.
• Check the PCMCIA Card Cable.
• Check L101.
• Check pin 70 of IC001.
Is the signal at pin 75 of IC003 correct?
OK
• Check IC003.
• Check IC004.
• Check IC003.
• Check IC004.

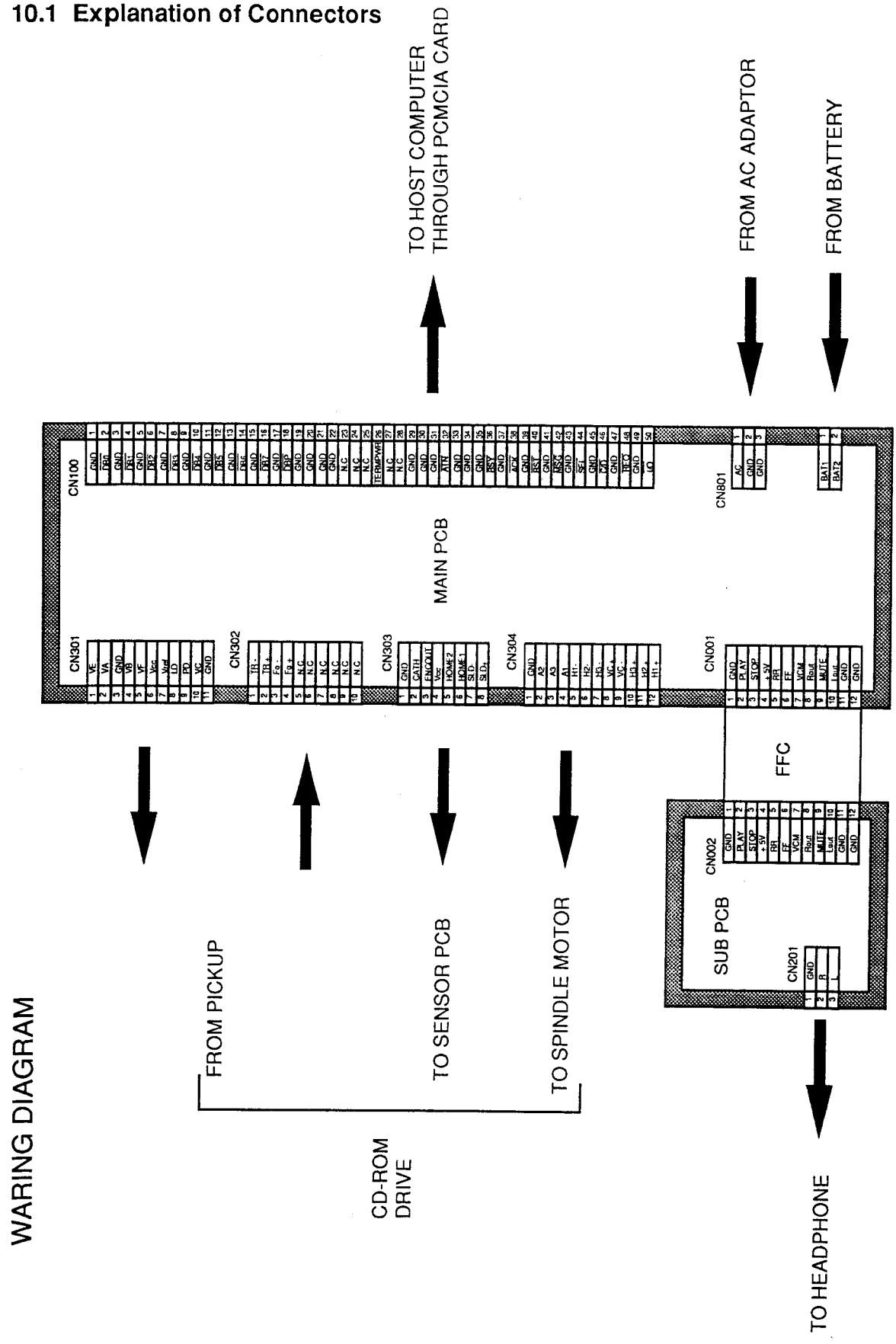

⑥
AUDIO CIRCUIT PROBLEM
Are the headphones connected properly ?
NO
• Connect the headphones correctly.
• Headphones problem.
OK
Is the collector voltage of Q811 +5V ?
NO
Check Q811 and Q812.
OK
Are the signals at pins 1 and 4 of IC201 correct ?
NO
OK
Is the connection of the Cable from CN001 to CN002 correct ?
NO
Connect the cable.
OK
Are the signals at pins 1 and 7, IC203 correct ?
NO
• Check VR201.
• Check IC203.
OK
• Check the phones jack (CN201).
• Check L201-L203.
• Check the Headphones.
Are the signals at pins 5 - 7 of IC203 correct ?
NO
OK
• Check IC201.
• Check IC003.

⑦ CPU AND CONTROL CIRCUIT PROBLEM



10. Schematic Diagram

10.1 Explanation of Connectors



CN 001

Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
1	GND	Ground	—	7	VCM	Audio Circuit Power	—
2	PLAY	Audio Key Signal	In	8	Rout	Audio R Channel Signal	Out
3	STOP		In	9	MUTE	Mute Signal	Out
4	+ 5V	+ 5V	—	10	Lout	Audio L Channel Signal	Out
5	RR	Audio Key Signal	In	11	GND	Ground	—
6	FF		In	12	GND	Ground	—

CN 002

Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
1	GND	Ground	—	7	FF	Audio Key Signal	Out
2	GND	Ground	—	8	RR		Out
3	Lout	Audio L Channel Signal	In	9	+ 5V	+ 5V	—
4	MUTE	Mute Signal	In	10	STOP	Audio Key Signal	Out
5	Rout	Audio R Channel Signal	In	11	PLAY		Out
6	VCM	Audio Circuit Power	—	12	GND	Ground	—

CN 100

Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
1	GND	Ground	—	26	TERMPWR	SCSI Terminator Power	—
2	$\overline{DB0}$	Data Bus Bit 0	I/O	27	N.C	Reserve	—
3	GND	Ground	—	28	N.C	Reserve	—
4	$\overline{DB1}$	Data Bus Bit 1	I/O	29	GND	Ground	—
5	GND	Ground	—	30	GND	Ground	—
6	$\overline{DB2}$	Data Bus Bit 2	I/O	31	GND	Ground	—
7	GND	Ground	—	32	$\overline{ATN}$	Attenuation	In
8	$\overline{DB3}$	Data Bus Bit 3	I/O	33	GND	Ground	—
9	GND	Ground	—	34	GND	Ground	—
10	$\overline{DB4}$	Data Bus Bit 4	I/O	35	GND	Ground	—
11	GND	Ground	—	36	$\overline{BSY}$	Busy	I/O
12	$\overline{DB5}$	Data Bus Bit 5	I/O	37	GND	Ground	—
13	GND	Ground	—	38	$\overline{ACK}$	Acknowledge	In
14	$\overline{DB6}$	Data Bus Bit 6	I/O	39	GND	Ground	—
15	GND	Ground	—	40	$\overline{RST}$	Reset	I/O
16	$\overline{DB7}$	Data Bus Bit 7	I/O	41	GND	Ground	—
17	GND	Ground	—	42	$\overline{MSG}$	Message	Out
18	$\overline{DBP}$	Data Bus Bit Parity	I/O	43	GND	Ground	—
19	GND	Ground	—	44	$\overline{SEL}$	Select	I/O
20	GND	Ground	—	45	GND	Ground	—
21	GND	Ground	—	46	$\overline{C/D}$	Control / Data	Out
22	GND	Ground	—	47	GND	Ground	—
23	N.C	Reserve	—	48	$\overline{REQ}$	Request	Out
24	N.C	Reserve	—	49	GND	Ground	—
25	N.C	Open	—	50	$\overline{I/O}$	Input / Output	Out

CN 301

Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
1	VE	Optical Photodiode Output	In	7	Vref		—
2	VA		In	8	LD	Laser Diode Signal	Out
3	GND	Ground	—	9	PD	Photodiode Signal	In
4	VB	Optical Photodiode Output	In	10	VC	OPT Photodiode Out	In
5	VF		In	11	GND	Ground	—
6	Vcc	+ 5V	—				

CN 302

Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
1	TR -	Tracking Coil Drive Signal	Out	6	N.C	No Connection	—
2	TR +		Out	7	N.C		—
3	Fo -	Focus Coil Drive Signal	Out	8	N.C		—
4	Fo +		Out	9	N.C		—
5	N.C	No Connection	—	10	N.C		—

CN 303

Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
1	GND	Ground	—	5	HOME2	Home Switch Signal	In
2	CATH	Encoder Signal	In	6	HOME1		In
3	ENCOUT		In	7	SLD-	Traverse Motor (-)	Out
4	Vcc	+ 5V	—	8	SLD+	Traverse Motor (+)	Out

CN 304

Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
1	GND	Ground	—	7	H3 -	Home Signal Output (-)	In
2	A2	Spindle Motor Driver Signal	Out	8	VC +	Hole Bias (+)	—
3	A3		Out	9	VC -	Hole Bias (-)	—
4	A1		Out	10	H3 +	Hole Signal Output (+)	In
5	H1-	Hole Signal Output (-)	In	11	H2 +	Hole Signal Output (+)	In
6	H2-	Hole Signal Output (-)	In	12	H1 +	Hole Signal Output (+)	In

CN 801

Pin No.	Signal Name	Description	In/Out
1	AC (Adaptor)	+ 10Vdc	—
2	GND	Ground	—
3	GND	Ground	—

To Battery

Pin No.	Signal Name	Description	In/Out
BAT1	BATTERY	+ 9Vdc	—
BAT2	GND	Ground	—

CN 201

Pin No.	Signal Name	Description	In/Out
1	GND	Ground	—
2	R	Audio Signal Out	OUT
3	L		OUT

CN 901

Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
1	GND	Ground	---	35	GND	Ground	---
2	D3	Data bit 3	I/O	36	*CD1	Card Detect 1	Out
3	D4	Data bit 4	I/O	37	D11	Data bit 11	I/O
4	D5	Data bit 5	I/O	38	D12	Data bit 12	I/O
5	D6	Data bit 6	I/O	39	D13	Data bit 13	I/O
6	D7	Data bit 7	I/O	40	D14	Data bit 14	I/O
7	*CE1	Card Enable 1	In	41	D15	Data bit 15	I/O
8	A10	Address bit 10	In	42	*CE2	Card Enable 2	In
9	*OE	Output Enable	In	43	RFSH	N.C.	---
10	A11	Address bit 11	In	44	*IORD	I/O Read	In
11	A9	Address bit 9	In	45	*IOWR	I/O Write	In
12	A8	Address bit 8	In	46	A17	Address bit 17	In
13	A13	Address bit 13	In	47	A18	Address bit 18	In
14	A14	Address bit 14	In	48	A19	Address bit 19	In
15	*WE	Write Enable	In	49	A20	Address bit 20	In
16	*IRQ	Interrupt Request	Out	50	A21	Address bit 21	In
17	VCC		---	51	VCC		---
18	VPP1	N.C.	---	52	VPP2	N.C.	---
19	A16	Address bit 16	In	53	A22	Address bit 22	In
20	A15	Address bit 15	In	54	A23	Address bit 23	In
21	A12	Address bit 12	In	55	A24	Address bit 24	In
22	A7	Address bit 7	In	56	A25	Address bit 25	In
23	A6	Address bit 6	In	57	RFU	Reserved	---
24	A5	Address bit 5	In	58	RESET	Card Reset	In
25	A4	Address bit 4	In	59	*WAIT	Extend bus cycle	Out
26	A3	Address bit 3	In	60	*INPACK	Input Port Acknowlege	Out
27	A2	Address bit 2	In	61	*REG	Register Select	In
28	A1	Address bit 1	In	62	*SPKR	Not Used	---
29	A0	Address bit 0	In	63	*STSCHG	Not Used	---
30	D0	Data bit 0	I/O	64	D8	Data bit 8	I/O
31	D1	Data bit 1	I/O	65	D9	Data bit 9	I/O
32	D2	Data bit 2	I/O	66	D10	Data bit 10	I/O
33	*IOIS16	I/O Port Is 16-bit	Out	67	*CD2	Card Detect 2	Out
34	GND	Ground	---	68	GND	Ground	---

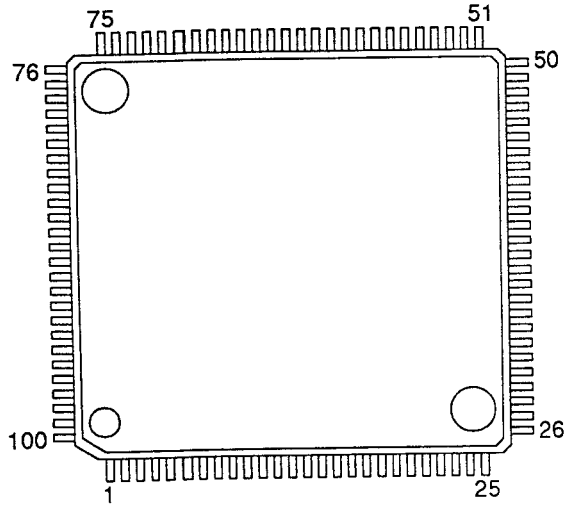
* active low signal.

CN 902

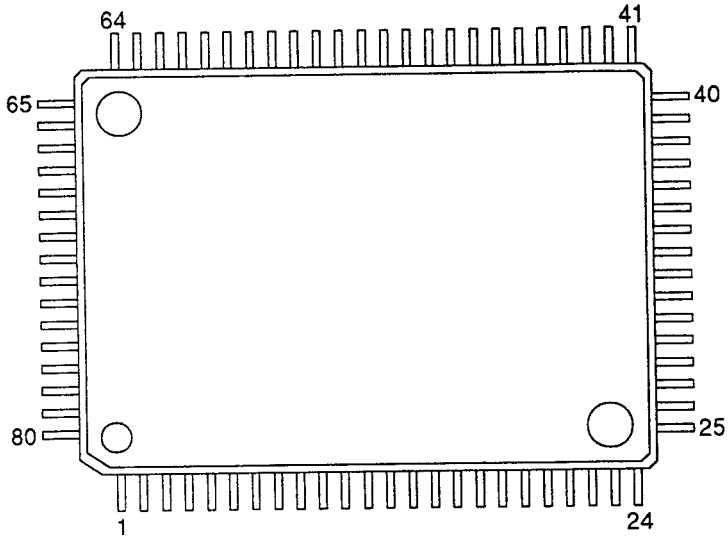
Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
1	*REQ	Request	In	15	*DB0	Data Bus Bit 0	I/O
2	GND	Ground	---	16	*DB1	Data Bus Bit 1	I/O
3	*MSG	Message	In	17	GND	Ground	---
4	*C/D	Control/Data	In	18	*DB2	Data Bus Bit 2	I/O
5	*I/O	Input/Output	In	19	*DB3	Data Bus Bit 3	I/O
6	GND	Ground	---	20	*DB4	Data Bus Bit 4	I/O
7	*RST	Reset	I/O	21	*DB5	Data Bus Bit 5	I/O
8	*ATN	Attention	Out	22	GND	Ground	---
9	*ACK	Acknowledge	Out	23	*DB6	Data Bus Bit 6	I/O
10	GND	Ground	---	24	TPWR		---
11	*BSY	Busy	I/O	25	*DB7	Data Bus Bit 7	I/O
12	*SEL	Select	I/O				
13	GND	Ground	---				
14	*DBP	Data Bus Bit Parity	I/O				

* active low signal.

10.2 Component Reference Guide



IC001



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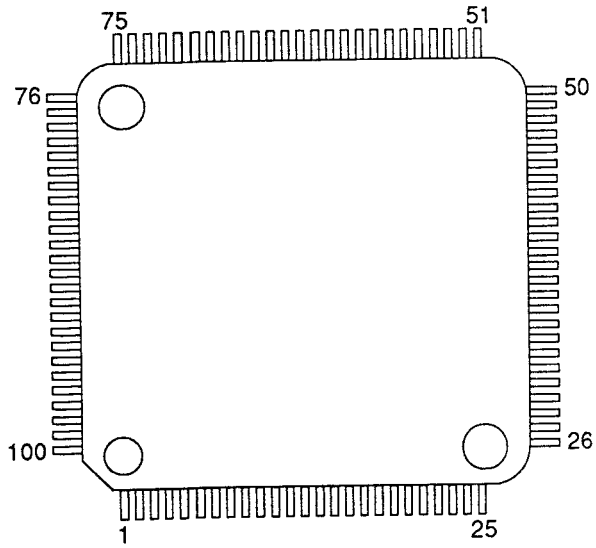

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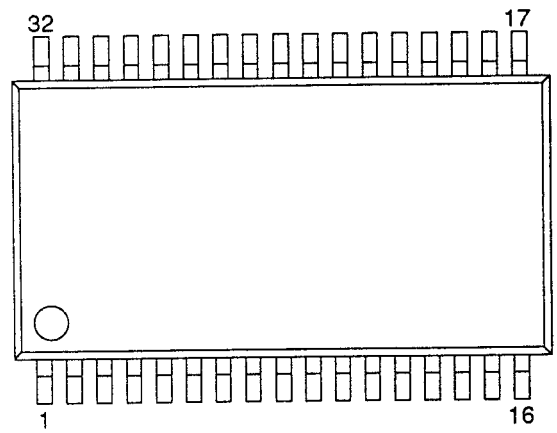

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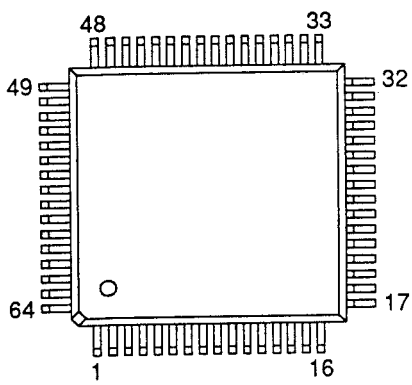

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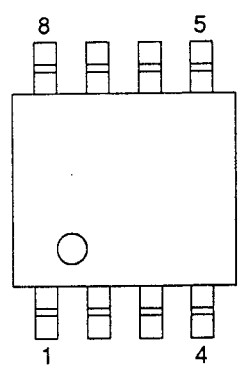

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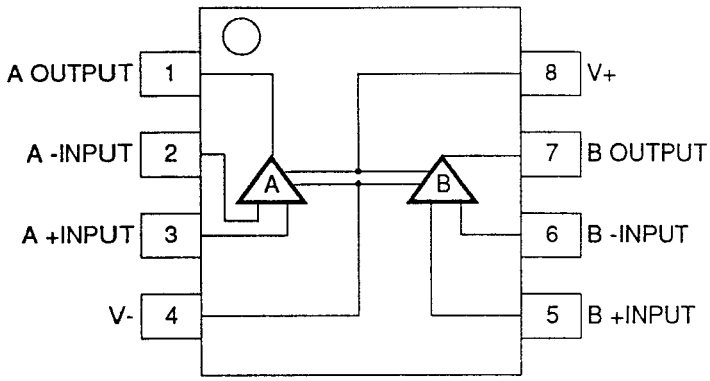

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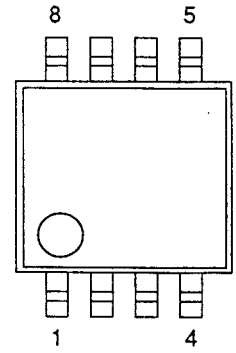

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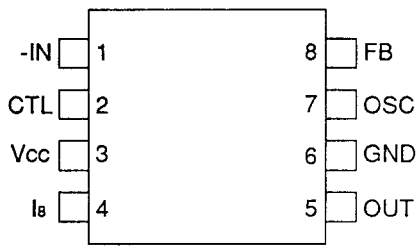
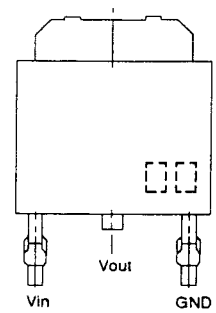
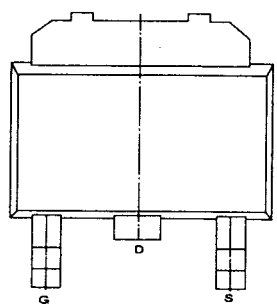


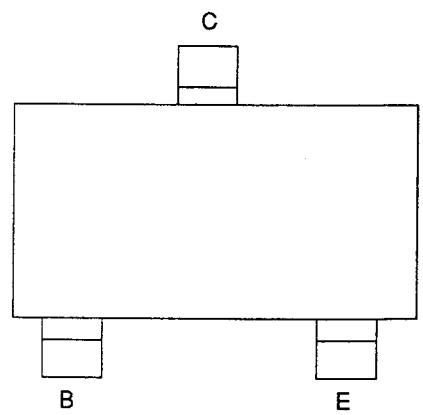
MB3776AFP (IC801)



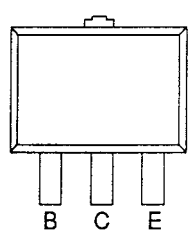
PQ05SZ5U (IC802)



2SJ234 (Q801)



MUN5111 (Q203,805,814,821)
MUN5211 (Q807,812,815,817,822)
MSD1819 (Q802,804,806,809,819,820)
MSB1218 (Q301,803)



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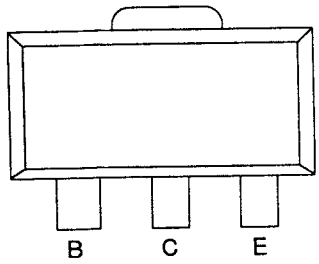

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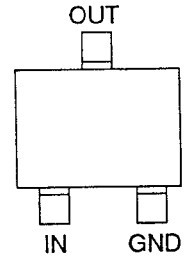
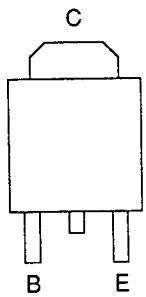
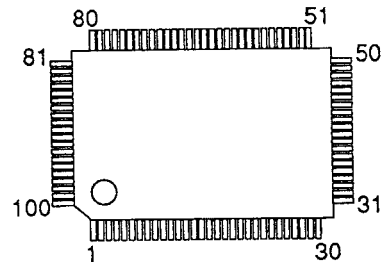


DTB113EK (Q811)



2SC5103 (Q810)



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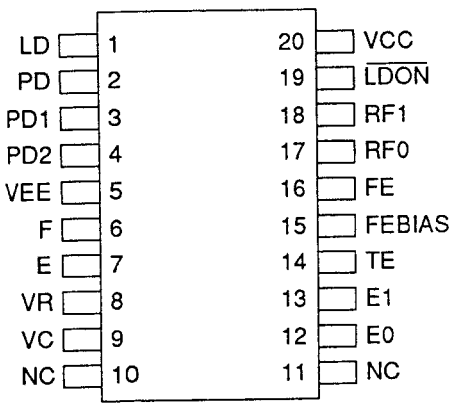
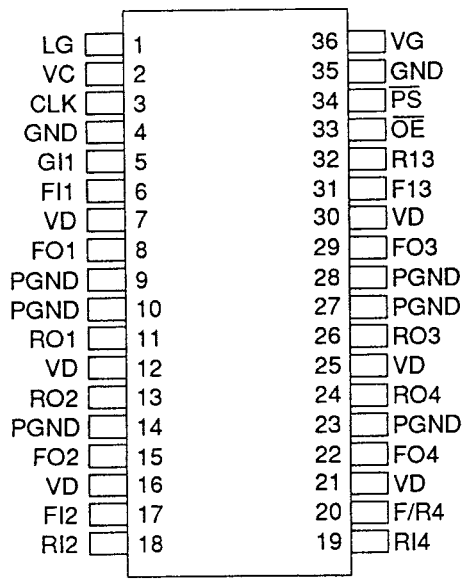
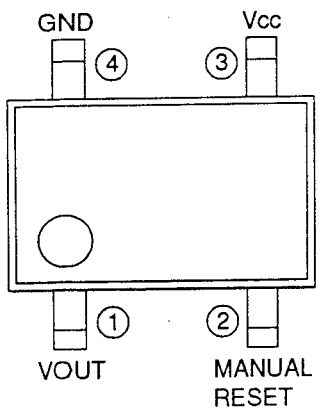


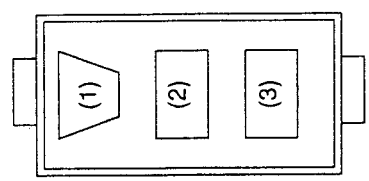
IC302



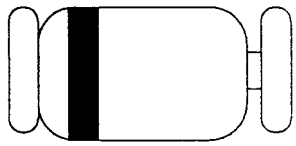
IC303



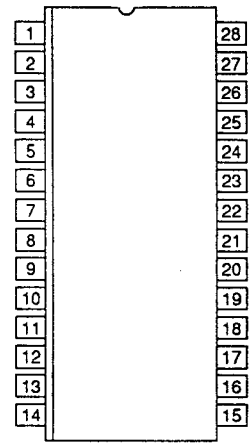
PST591 (IC404)



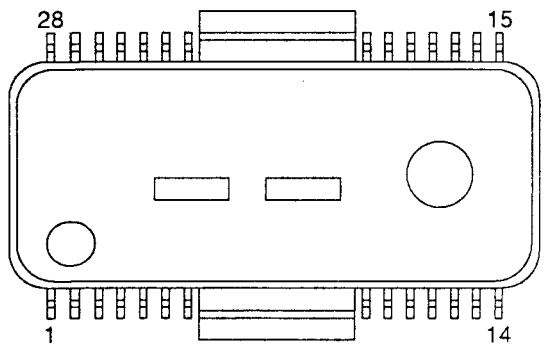
EC10QS04 (D102,803,805)
EC10QS03L (D101,802, 806)
DIF10T (D801)



RLZJ5.6B (D804,807,808)
RLS71 (D001,301,302,809)



UC5602DWP (IC101)



BA6840FP (IC304)

IC 003 (CXD1803R)

Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
1	VDD	Reset	----	36	XSAC	SCSI ACK Signal	Out
2	GND	Ground	----	37	MA0	Buffer Memory Address	In
3	D2	CPU Data Buss	In/Out	38	GND	Ground	—
4	D3		In/Out	39	MA1	Buffer Memory Address	In
5	D4		In/Out	40	MA2		In
6	D5		In/Out	41	MA3		Out
7	GND	Ground	----	42	MA4		Out
8	D6	CPU Data Buss	In/Out	43	MA5		Out
9	D7		In/Out	44	MA6		Out
10	XCS	Chip Select Signal	In	45	GND	Ground	—
11	XRD	CPU Read Signal	In	46	MA7		Out
12	XWR	CPU Write Signal	In	47	MA8		Out
13	GND	Ground	—	48	MA9	Buffer Memory Address	Out
14	XINT	Interrupt Output	Out	49	MA10		Out
15	A0	CPU Address Buss	In	50	MA11		Out
16	A1		In	51	VDD	+5V	—
17	A2		In	52	GND	Ground	—
18	A3		In	53	MA12	Buffer Memory Address	Out
19	DRAM	DRAM Select Signal	In	54	MA13		Out
20	A4	CPU Address Buss	In	55	XME0	Buffer Memory Enable	Out
21	TD0	Not Used	In/Out	56	MA14	Buffer Memory Address	Out
22	XSRD	SCSI Controller Read Signal	Out	57	MA15		Out
23	XSWR	SCSI Controller Write Signal	Out	58	GND	Ground	Out
24	SD0	SCSI Controller Data Bus	In/Out	59	MA16/XRAS	DRAM RAS Signal	Out
25	SD1		In/Out	60	XME1	Buffer Memory Enable	Out
26	VDD	+5V	—	61	XMOE/XCAS	DRAM CAS Signal	Out
27	GND	Ground	—	62	XMWR	Buffer Memory Write	Out
28	SD2	SCSI Controller Data Bus	In/Out	63	GND	Ground	—
29	SD3		In/Out	64	MDB0	CPU Address Bus	In/Out
30	SD4		In/Out	65	MDB1		In/Out
31	SD5		In/Out	66	MDB2		In/Out
32	SD6		In/Out	67	MDB3		In/Out
33	GND	Ground	—	68	MDB4		In/Out
34	SD7	SCSI Controller Data Bus	Out	69	GND	Ground	—
35	SDRQ	SCSI DRQ Signal	In	70	MDB5	CPU Address Bus	In/Out

Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
71	MDB6	CPU Address Bus	In/Out	86	EMP	Emphasis Signal	In
72	MDB7		In/Out	87	XRST	Reset	In
73	MDBP		In/Out	88	GND	Ground	—
74	XTL2	X'tal Output	Out	89	DATO	Data (To D/A)	Out
75	XTL1	X'tal Input	In	90	LRCO	LR Clock (To D/A)	—
76	VDD	+5V	—	91	WCKO	Not Used	Out
77	GND	Ground	—	92	BCKO	Bit Clock (To D/A)	Out
78	CLK	Not Used	Out	93	MUTE	Not Used	Out
79	HCLK	Not Used	Out	94	TD5	Not Used	In/Out
80	CKSL	Clock Select	In	95	TD4		In/Out
81	RMCK	CD-ROM Decoder Clock	In	96	TD3		In/Out
82	LRCK	LR Clock	In	97	TD2		In/Out
83	DATA	DSP Data	In	98	TD1		In/Out
84	BCLK	Bit Clock	In	99	D0	CPU Data Buss	In/Out
85	C2PO	Error Flag	In	100	D1		In/Out

IC 102 (CXD1185CR)

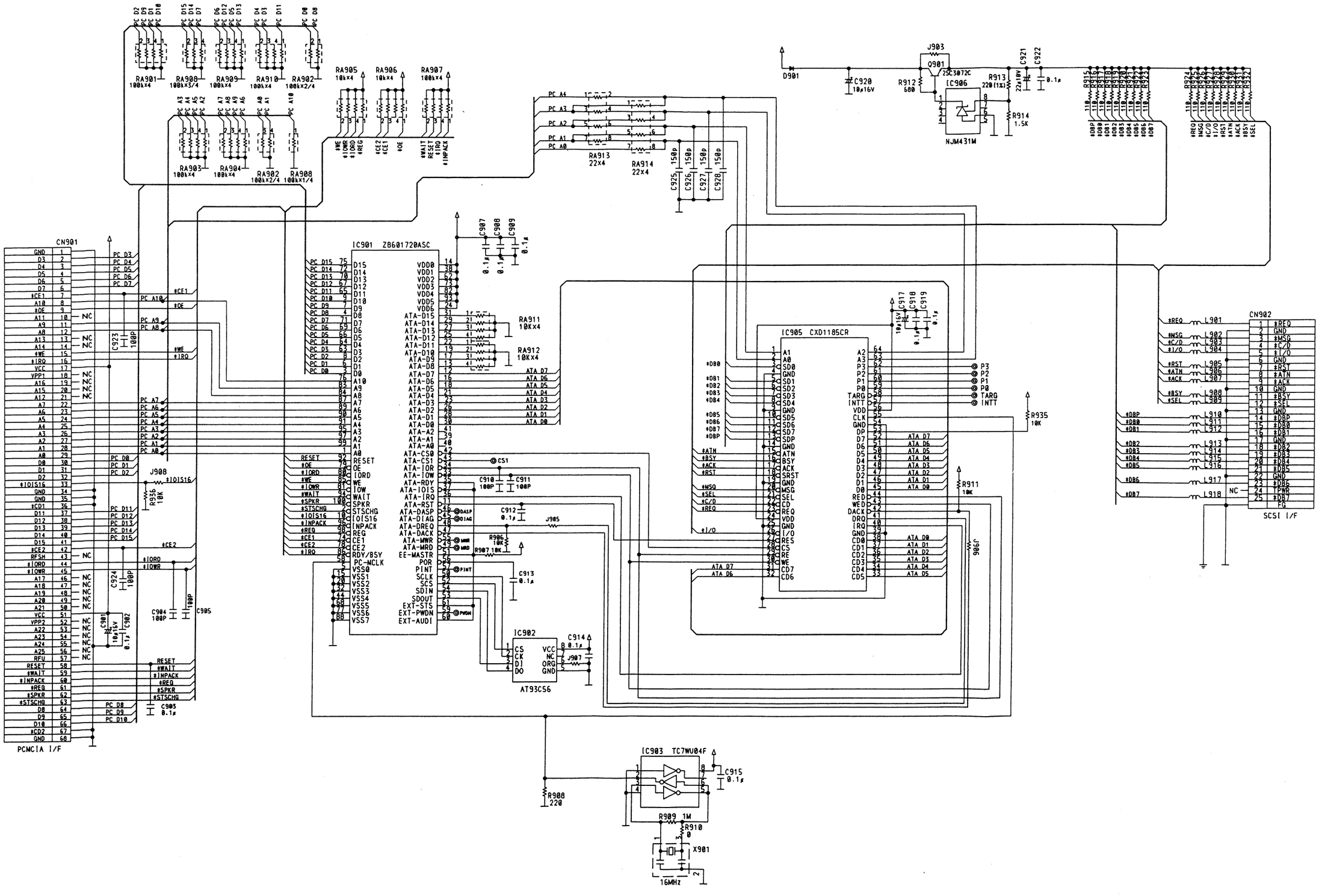
Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
1	A1	CPU Address Bus	In	33	C5	CPU Data Bus	In/Out
2	A0		In	34	C4		In/Out
3	$\overline{DB0}$	CPU Data Bus	In/Out	35	C3		In/Out
4	VSS	Ground	—	36	C2		In/Out
5	$\overline{DB1}$	SCSI Data Bus	In/Out	37	C1		In/Out
6	$\overline{DB2}$		In/Out	38	C0		In/Out
7	$\overline{DB3}$		In/Out	39	VSS	Ground	—
8	$\overline{DB4}$		In/Out	40	IRQ	Interrupt Request Signal	Out
9	VSS	Ground	—	41	DRQ	DMA Request Signal	Out
10	$\overline{DB5}$	SCSI Data Bus	In/Out	42	DACK	DMA ACK Signal	In
11	$\overline{DB6}$		In/Out	43	$\overline{WED}$	SCSI $\overline{WED}$ Signal	In
12	$\overline{DB7}$		In/Out	44	$\overline{RED}$	SCSI $\overline{RED}$ Signal	In
13	$\overline{DBP}$	SCSI $\overline{DBP}$ Signal	In/Out	45	D0	Data Bus	In/Out
14	VSS	Ground	—	46	D1		In/Out
15	$\overline{ATN}$	$\overline{SCSI}$ ATN Signal	In/Out	47	D2		In/Out
16	$\overline{BSY}$	$\overline{SCSI}$ BSY Signal	In/Out	48	D3		In/Out
17	$\overline{ACK}$	$\overline{SCSI}$ ACK Signal	In/Out	49	D4		In/Out
18	$\overline{RST}$	SCSI $\overline{RST}$ Signal	In/Out	50	D5		In/Out
19	VSS	Ground	—	51	D6		In/Out
20	$\overline{MSG}$	$\overline{SCSI}$ MSG Signal	In/Out	52	D7		In/Out
21	$\overline{SEL}$	$\overline{SCSI}$ SEL Signal	In/Out	53	DP	Data parity	In/Out
22	$\overline{C/D}$	SCSI $\overline{CD}$ Signal	In/Out	54	VSS	Ground	—
23	$\overline{REQ}$	SCSI $\overline{REQ}$ Signal	In/Out	55	CLK	CLOCK	In
24	VDD	+5V	—	56	VDD	+5V	—
25	VSS	Ground	—	57	INIT	Not Used	Out
26	$\overline{I/O}$	SCSI $\overline{I/O}$ Signal	In/Out	58	TARG	Not Used	Out
27	$\overline{RES}$	SCSI $\overline{RES}$ Signal	In	59	P0	Not Used	In/Out
28	$\overline{CS}$	SCSI $\overline{CS}$ Signal	In	60	P1		In/Out
29	$\overline{RE}$	SCSI $\overline{RE}$ Signal	In	61	P2		In/Out
30	$\overline{WE}$	SCSI $\overline{WE}$ Signal	In	62	P3		In/Out
31	C7	CPU Data Bus	In/Out	63	A3	CPU Address Bus	In
32	C6		In/Out	64	A2		In

IC 301 (CXD2515Q)

Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
1	SRON	Traverse motor Control	Out	36	RFAC	EFM Signal output	In
2	SRDR		Out	37	BIAS	Constant Current input	In
3	SFON		Out	38	ASYI	Comparete Voltage input	In
4	TFDR	Tracking coil Drive Output	Out	39	ASYO	EFM fulswing output	Out
5	TRON		Out	40	AVDD	+5.0V	—
6	TRDR		Out	41	VDD	+5V	—
7	TFON		Out	42	ASYE	Asymmetry ON/OFF	In
8	FFDR	Focus coil Drive Output	Out	43	PSSL	Audio data output SW	In
9	FRON		Out	44	WDCK	Not Used	Out
10	FRDR		Out	45	LRCK	LR clock Signal	Out
11	FFON		Out	46	DA16	CD data	Out
12	VCOO	Analog EFM osc output	Out	47	DA15	Bit clock	Out
13	VCOI	Analog EFM osc input	In	48	DA14		Out
14	TEST	Not Used	Out	49	DA13		Out
15	VSS	Ground	—	50	DA12		Out
16	TES2	Not Used	—	51	DA11	Not Used	Out
17	TES3		—	52	DA10		Out
18	PDO	Not Used	Out	53	DA09		Out
19	VPCO		Out	54	DA08		Out
20	VCKI	clock input	In	55	DA07		Out
21	AVDD	+5V	—	56	DA06	C2PO Output	Out
22	IGEN	OP. Amp current source	In	57	DA05	Not Used	Out
23	AVSS	Ground	—	58	DA04		Out
24	ADII	A/D converter input	In	59	DA03		Out
25	ADIO	OP.amp output	Out	60	DA02		Out
26	RFDC	RF Signal input	In	61	DA01		Out
27	TE	Tracking Error Signal	In	62	XTAI	X'tal Input	In
28	SE	Sled Error Signal	In	63	XTAO	X'tal Output	Out
29	FE	Focus Error Signal	In	64	XTSL	X'tal Select Input	In
30	VC	+2.5V	In	65	VSS	Ground	—
31	FILO	PLL Filter Output	Out	66	FSTI	Clock Input	In
32	FILI	PLL Filter Input	In	67	FSTO	Clock Output	Out
33	PCO	PLL charge pump output	Out	68	C4M	4.2336MHz Output	Out
34	CLTV	VCO control Voltage	In	69	C16M	16.9344MHz Output	Out
35	AVSS	Ground	—	70	MD2	Digital-Out ON/OFF	In

Pin No.	Signal Name	Description	In/Out	Pin No.	Signal Name	Description	In/Out
71	DOUT	Digital-Out	Out	86	DATA	CPU Command Input	In
72	EMPH	Emphasis Output	Out	87	XLAT	Command Latch Input	In
73	WFCK	Not Used	Out	88	CLOK	Command Clock Input	In
74	SCOR	Sub Code Sink	Out	89	COUT	Track Count Signal	Out
75	SBSO	Not Used	Out	90	VDD	+5V	—
76	EXCK	Not Used	In	91	MIRR	Not Used	Out
77	SQSO	SubQ Output	Out	92	DFCF	Not Used	Out
78	SQCK	SubQ Clock	In	93	FOK	Focus OK Signal	Out
79	MUTE	Mute Select	In	94	FSW	Not Used	Out
80	SENS	SENS Output	Out	95	MON	Not Used	Out
81	XRST	Reset	In	96	MDP	Spindle-Motor Servo	Out
82	DIRC	Not Used	In	97	MDS	Not Used	Out
83	SCLK	SENS Read Clock	In	98	LOCK	LOCK Signal	Out
84	DFSW	Not Used	In	99	SSTP	Home SW Signal	In
85	ATSK	Antishok Terminal	In	100	SFDR	Sled Drive Signal	Out

10.3.2 PCMCIA Card Schematic Diagram



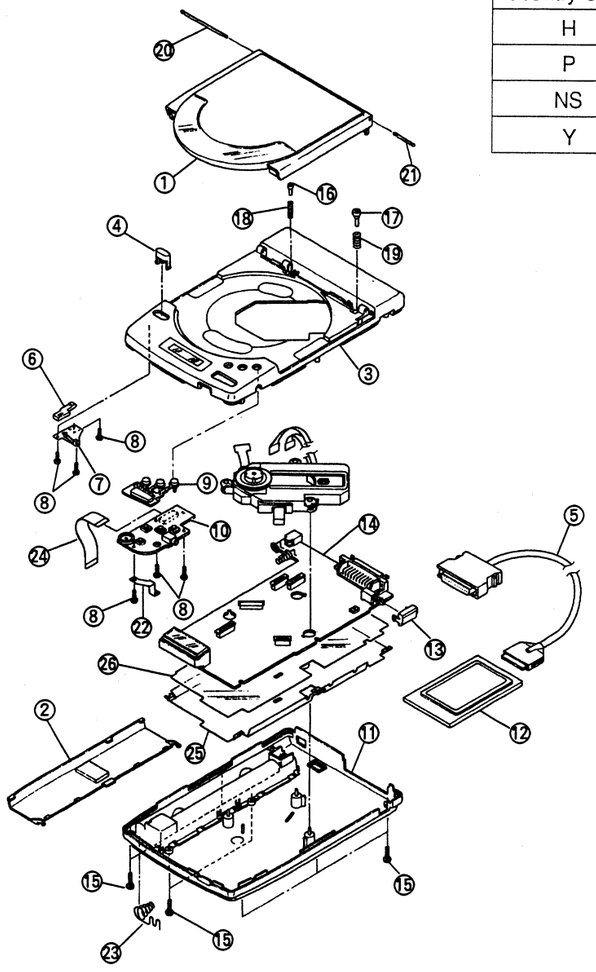
11. Replacement Parts List with Lubrication Guide

Notes:

1. Important safety notice.
   Components identified by ⚠ mark have special characteristics important for safety.
   When replacing any of these components, use only manufacture's specified parts.
2. The S mark is for service standard parts and may differ from production parts.
3. The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention.
   After the end of this period, the assembly will no longer be available.
4. All capacitor values are in microfarads unless otherwise noted.

11.1 Covers and Packing Material

Country Code	Country
H	Hong Kong
P	Singapore
NS	Indonesia
Y	Sweden

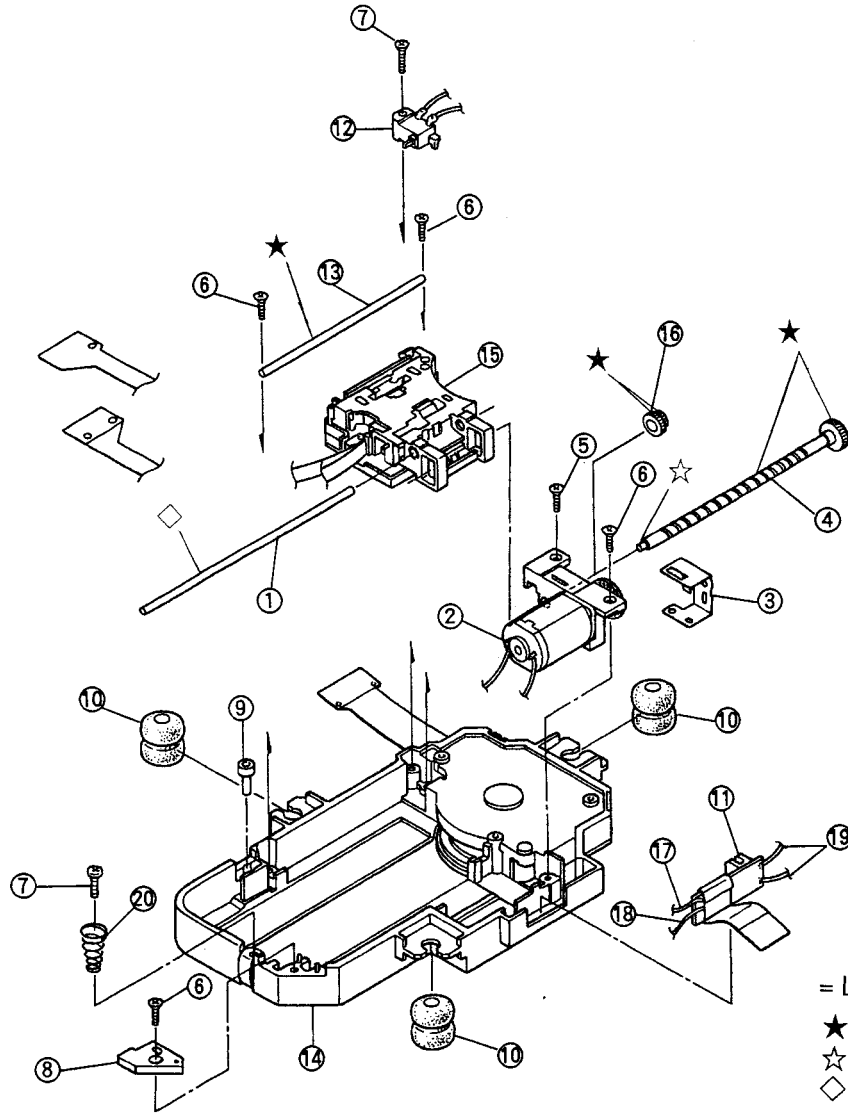


Ref No.	Part No.	Part Name and Description	Per Set	Remarks
1	PJYKD720M	Disc Cover Assembly	1	
2	PJYK1D720M	Battery Cover Assembly	1	
3	PJYFD720M	Upper Cover Assembly	1	
4	PJBC52Z	Open Button	1	
5	PJJS1085Z	SCSI Cable with Ferrite Core	1	
6	PJHR3140Z	Lock Lever	1	
7	PJUS287Z	Lock Spring	1	
8	XQN17+AJ5FZ	Screw 1.7 x 5 mm	6	
9	PJBC51Z	Play Button	1	
10	PJWPD720M	Sub Board Complete	1	RTL
11	PJYMD720H	Bottom Cover Assembly [H]	1	
	PJYMD720P	Bottom Cover Assembly [P]	1	
	PJYMD720NS	Bottom Cover Assembly [NS]	1	
	PJYMD720Y	Bottom Cover Assembly [Y]	1	
12	PJWBD720H	Card Complete [H, P]	1	RTL
	PJWBD720M	Card Complete	1	RTL
13	PJBC53Z	Power Switch Button	1	
14	PJWP1D720M	Main Board Complete	1	
15	XQN2+AJ8FZ	Screw 2 x 8 mm	8	
16	PJDE114Z	Pin (L)	1	
17	PJDE115Z	Pin (R)	1	
18	PJDS4130Z	Spring (L)	1	
19	PJDS51020Z	Spring (R)	1	
20	PJDF9528Z	Hinge Shaft (L)	1	
21	PJDF9511Z	Hinge Shaft (R)	1	
22	PJMDA0004Z	Earth Plate	1	
23	PJJT330Z	Battery Terminal	1	
24	PJJE351Z	Flat Cable	1	
25	PJMC223Z	Shield Plate	1	
26	PJHRA0026Z	Bottom Sheet	1	

Packing Materials

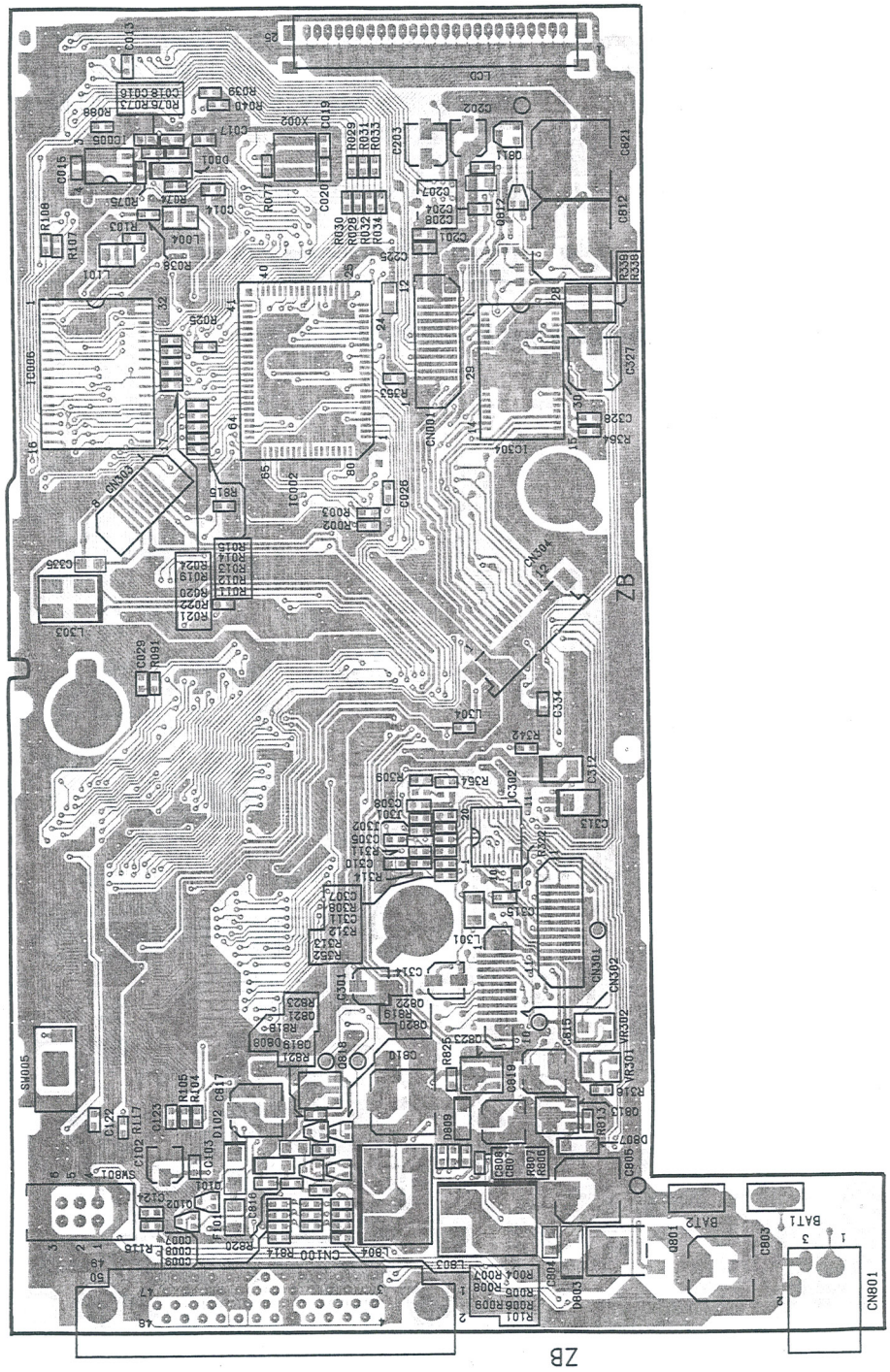
Ref No.	Part No.	Part Name and Description	Per Set	Remarks
1	PJPK649X	Carton	1	
	PJPK649Y	Carton [Y]	1	
2	PJPN930X	Tray Pad	1	
	PJPN930Y	Tray Pad [Y]	1	
3	PJPNA0009X	Pad	1	
	PJPNA0009Z	Pad [Y]	1	
4	PJPNA0010Z	Rubber Pad	1	
5	PJPF88Z	Sky Poly Bag	1	
6	PJPN931X	Pad Sheet	1	
	PJPN931Y	Pad Sheet [Y]	1	
7	PJQMA0045Z	Instruction Book	1	
	PJQMA0043Z	Instruction Book (Sweden) [Y]	1	
8	PJJN42DD96WZ	Setup Disk	1	
9	KX-WZ308	AC Adaptor	1	
	KX-WZ307	AC Adaptor [NS]	1	
	KX-WZ310	AC Adaptor [Y]	1	

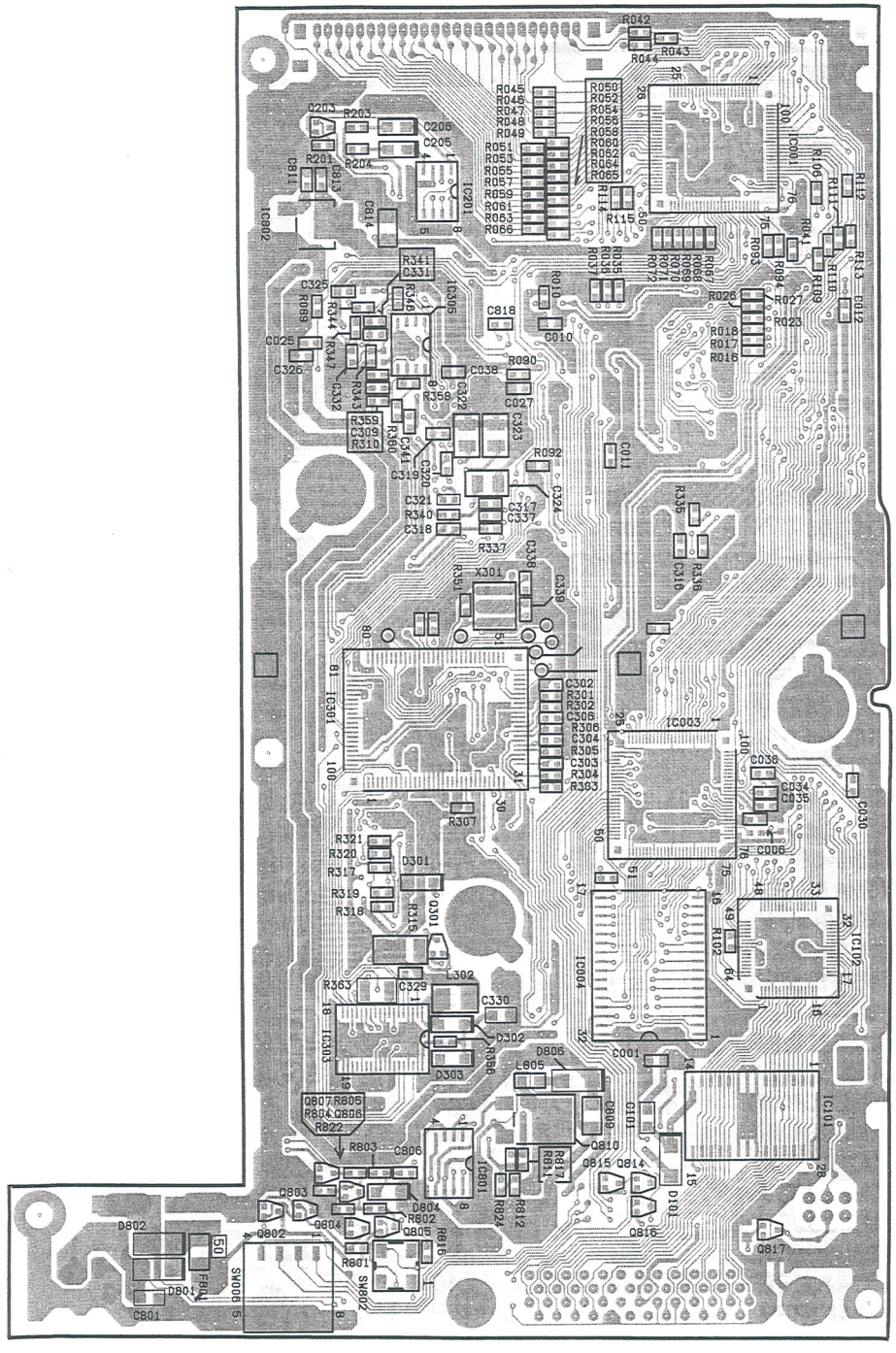
11.2 Drive Unit



Ref No.	Part No.	Part Name and Description	Per Set	Remarks
1	PJDF9513Z	Main Shaft	1	
2	PJWQD720M	Motor Assembly	1	
3	PJUS285Z	Thrust Spring	1	
4	PJZFD720M	Screw Shaft Assembly	1	
5	XQS17+CJ35FY	Screw 1.7 x 3.5 mm	1	
6	XQS17+CJ5FZ	Screw 1.7 x 5 mm	4	
7	XQN17+CJ6FY	Screw 1.7 x 6 mm	2	
8	PJHR3128Z	Shaft Cover	1	
9	JPSQ0001Y	FPC Stopper Pin	1	
10	PAHG13Y	Damper	3	
11	PJWP2D720M	Sensor Board Complete	1	RTL
12	PJSH1A43Z	Limit Switch	1	
13	PJDF9514Z	Guide Shaft	1	
14	PJZCD720M	Drive Unit Base Assembly	1	
15	PJZED720M	Pick Up Assembly	1	
16	PJDG50476Z	Gear	1	
17	PJJT344Z	Lead Wire	1	
18	PJJT345Z	Lead Wire	1	
19	PJJT343Z	Lead Wire	2	
20	PJDSA0005Z	Earth Spring	1	

11.3 Main Logic Board





Main Logic Board

Ref.No.	Part No.	Part Name and Description			Per Set	Remarks
IC001	PJVJJDJC001Z	IC			1	
IC002	PJVIM37732S	IC			1	
IC003	PJVICXD1803R	IC			1	
IC004	PJVMSP8H01PZ	IC S-RAM			1	
IC005	PJVIPST591DM	IC			1	
IC006	PJWILD720M	IC ROM			1	
IC101	PJVIUC5602DW	IC			1	
IC102	PJVICXD1185C	IC			1	
IC201	PJVIUPD6379	IC			1	
IC301	PJVICXD2515Q	IC			1	
IC302	PJVICXA1571N	IC			1	
IC303	PJVIMPC17A38	IC			1	
IC304	PJVIBA6840FP	IC			1	
IC305	PJVILA6358M	IC			1	
IC801	PJVIMB3776AP	IC			1	
IC802	PJVIPQ05SZ5	IC			1	
C001	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C006-018	ECUV1C104ZFV	0.1	16V	Ceramic	13	
C019,020	ECUV1H050CCV	5P	50V	Ceramic	2	
C025	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C026,027	ECUV1H103KBV	0.01	50V	Ceramic	2	
C029,030	ECUV1C104ZFV	0.1	16V	Ceramic	2	
C034-036	ECUV1H101JCV	100P	50V	Ceramic	3	
C038	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C101	ECUV1C225ZFX	2.2	16V	Ceramic	1	
C102	ECEV1CA100SR	10	16V	Electrolytic	1	
C103	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C122-124	ECUV1C104ZFV	0.1	16V	Ceramic	3	
C201	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C202	ECEV1CA100SR	10	16V	Electrolytic	1	
C203	ECEV0JA470SP	47	6.3V	Electrolytic	1	
C204	PJCUA1105ZF5	1	16V	Ceramic	1	
C205,206	ECST0JA106KR	10	6.3V	Electrolytic	2	
C207,208	ECUV1H472KBV	4700P	50V	Ceramic	2	
C225	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C301	ECEV1EA4R7SR	4.7	25V	Electrolytic	1	
C302	ECUV1H103KBV	0.01	50V	Ceramic	1	
C303	ECUV1C473KBV	0.047	16V	Ceramic	1	
C304	ECUV1H152KBV	1500P	50V	Ceramic	1	
C305	ECUV1H103KBV	0.01	50V	Ceramic	1	
C306	ECUV1H221KBV	220P	50V	Ceramic	1	
C307,308	ECUV1H681KBV	680P	50V	Ceramic	2	
C309	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C310	ECUV1H270JCV	27P	50V	Ceramic	1	
C311	ECUV1H020CCV	2P	50V	Ceramic	1	
C312,313	ECST0GB336KR	33	4V	Electrolytic	2	
C314	ECEV1CA100SR	10	16V	Electrolytic	1	
C315-321	ECUV1C104ZFV	0.1	16V	Ceramic	7	
C322-324	PJCUA1475ZF7	4.7	16V	Ceramic	3	
C325,326	ECUV1C104ZFV	0.1	16V	Ceramic	2	
C327	ECEV1CA470SP	47	16V	Electrolytic	1	
C328,329	ECUV1C104ZFV	0.1	16V	Ceramic	2	
C330	PJCUA1105ZF5	1	16V	Ceramic	1	
C331	ECUV1H103KBV	0.01	50V	Ceramic	1	
C332,334	ECUV1C104ZFV	0.1	16V	Ceramic	2	
C335	PJCUA1105ZF5	1	16V	Ceramic	1	

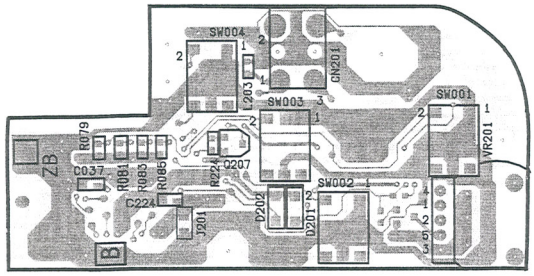
Ref.No.	Part No.	Part Name and Description			Per Set	Remarks
C337	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C338,339	ECUV1H050CCV	5P	50V	Ceramic	2	
C801	PJCUA1105ZF5	1	16V	Ceramic	1	
C803	ECEV1EUR101B	100	25V	Electrolytic	1	
C804	PJCUA1105ZF5	1	16V	Ceramic	1	
C805	ECEV1AUR221B	220	10V	Electrolytic	1	
C806	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C807	ECUV1H102KBV	1000P	50V	Ceramic	1	
C808	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C809	PJCUA1475ZF7	4.7	16V	Ceramic	1	
C810	ECEV1AUR331B	330	10V	Electrolytic	1	
C811	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C812	ECEV0JUR102B	1000	6.3V	Electrolytic	1	
C813	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C814	PJCUA1475ZF7	4.7	16V	Ceramic	1	
C815	ECEV0JA470SP	47	6.3V	Electrolytic	1	
C816	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C817	ECEV0JA101SP	100	6.3V	Electrolytic	1	
C818	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C819	ECEV0JA470SP	47	6.3V	Electrolytic	1	
C821	ECEV0JUR102B	1000	6.3V	Electrolytic	1	
R002	ERJ3EKF1502V	15K	1/16W	Resistor (Chip)	1	
R003	ERJ3EKF1002V	10K	1/16W	Resistor (Chip)	1	
R004-006	ERJ3GSYJ473V	47K	1/16W	Resistor (Chip)	3	
R007-009	ERJ3GSYJ102V	1K	1/16W	Resistor (Chip)	3	
R010	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	1	
R011-037	ERJ3GSYJ561V	560	1/16W	Resistor (Chip)	27	
R038	ERJ3GSYJ620V	62	1/16W	Resistor (Chip)	1	
R039-041	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	3	
R042-066	ERJ3GSYJ221V	220	1/16W	Resistor (Chip)	25	
R067-072	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	6	
R073	ERJ3GSYJ472V	4.7K	1/16W	Resistor (Chip)	1	
R074	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	1	
R075	ERJ3GSYJ473V	47K	1/16W	Resistor (Chip)	1	
R076	ERJ3GSYJ102V	1K	1/16W	Resistor (Chip)	1	
R077	ERJ3GSYJ105V	1M	1/16W	Resistor (Chip)	1	
R088	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	1	
R089	ERJ3GSYJ102V	1K	1/16W	Resistor (Chip)	1	
R090	ERJ3GSYJ101V	100	1/16W	Resistor (Chip)	1	
R091	ERJ3GSYJ102V	1K	1/16W	Resistor (Chip)	1	
R092	ERJ3GSYJ104V	100K	1/16W	Resistor (Chip)	1	
R093,094	ERJ3GSYJ561V	560	1/16W	Resistor (Chip)	2	
R101,102	ERJ3GSYJ473V	47K	1/16W	Resistor (Chip)	2	
R103	ERJ3GSYJ620V	62	1/16W	Resistor (Chip)	1	
R104,105	ERJ3GSYJ473V	47K	1/16W	Resistor (Chip)	2	
R106-115	ERJ3GSYJ561V	560	1/16W	Resistor (Chip)	10	
R116	ERJ3GSYJ102V	1K	1/16W	Resistor (Chip)	1	
R117	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	1	
R201	ERJ3GSYJ104V	100K	1/16W	Resistor (Chip)	1	
R203,204	ERJ3GSYJ102V	1K	1/16W	Resistor (Chip)	2	
R301	ERJ3GSYJ104V	100K	1/16W	Resistor (Chip)	1	
R302	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	1	
R303	ERJ3GSYJ682V	6.8K	1/16W	Resistor (Chip)	1	
R304	ERJ3GSYJ332V	3.3K	1/16W	Resistor (Chip)	1	
R305	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	1	
R306	ERJ3GSYJ105V	1M	1/16W	Resistor (Chip)	1	
R307	ERJ3GSYJ333V	33K	1/16W	Resistor (Chip)	1	

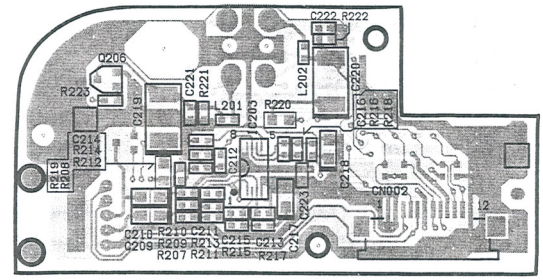
KXL-D720

Ref.No.	Part No.	Part Name and Description			Per Set	Remarks
R308,309	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	2	
R310	ERJ3GSYJ823V	82K	1/16W	Resistor (Chip)	1	
R311	ERJ3GSYJ472V	4.7K	1/16W	Resistor (Chip)	1	
R312	ERJ3GSYJ562V	5.6K	1/16W	Resistor (Chip)	1	
R313	ERJ3GSYJ102V	1K	1/16W	Resistor (Chip)	1	
R314	ERJ3GSYJ821V	820	1/16W	Resistor (Chip)	1	
R315	PJRJ12YJ100H	10	1/2W	Resistor (Chip)	1	
R316	ERJ3GSYJ223V	22K	1/16W	Resistor (Chip)	1	
R317-320	ERJ3GSYJ823V	82K	1/16W	Resistor (Chip)	4	
R321,322	ERJ3GSYJ184V	180K	1/16W	Resistor (Chip)	2	
R335	ERJ3GSYJ561V	560	1/16W	Resistor (Chip)	1	
R336	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	1	
R337	ERJ3GSYJ331V	330	1/16W	Resistor (Chip)	1	
R338,339	ERJ14YJ1R0V	1	1/4W	Resistor (Chip)	2	
R340	ERJ3GSYJ221V	220	1/16W	Resistor (Chip)	1	
R341	ERJ3GSYJ104V	100K	1/16W	Resistor (Chip)	1	
R342	ERJ3GSYJ333V	33K	1/16W	Resistor (Chip)	1	
R343	ERJ3GSYJ563V	56K	1/16W	Resistor (Chip)	1	
R344	ERJ3GSYJ472V	4.7K	1/16W	Resistor (Chip)	1	
R346	ERJ3GSYJ563V	56K	1/16W	Resistor (Chip)	1	
R347	ERJ3GSYJ222V	2.2K	1/16W	Resistor (Chip)	1	
R351	ERJ3GSYJ105V	1M	1/16W	Resistor (Chip)	1	
R352	ERJ3GSYJ473V	47K	1/16W	Resistor (Chip)	1	
R353	ERJ3GSYJ104V	100K	1/16W	Resistor (Chip)	1	
R354	ERJ3GSY0R00V	Dummy			1	
R356	ERJ3GSYJ100V	10	1/16W	Resistor (Chip)	1	
R358	ERJ3GSYJ822V	8.2K	1/16W	Resistor (Chip)	1	
R359	ERJ3GSYJ102V	1K	1/16W	Resistor (Chip)	1	
R360	ERJ3GSY0R00V	Dummy			1	
R363	ERJ14Y0R00V	Dummy			1	
R364	ERJ3GSYJ564V	560K	1/16W	Resistor (Chip)	1	
R801,802	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	2	
R803	ERJ3GSYJ332V	3.3K	1/16W	Resistor (Chip)	1	
R804	ERJ3GSYJ822V	8.2K	1/16W	Resistor (Chip)	1	
R805,806	ERJ3GSYJ222V	2.2K	1/16W	Resistor (Chip)	2	
R807	ERJ3GSYJ332V	3.3K	1/16W	Resistor (Chip)	1	
R811	ERJ3EKF4702V	47K	1/16W	Resistor (Chip)	1	
R812	ERJ3EKF1211V	1.21K	1/16W	Resistor (Chip)	1	
R813	ERJ3GSYJ102V	1K	1/16W	Resistor (Chip)	1	
R814,815	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	2	
R816	ERJ3GSYJ332V	3.3K	1/16W	Resistor (Chip)	1	
R817	ERJ3EKF4702V	47K	1/16W	Resistor (Chip)	1	
R818	ERJ6GEYJ331V	330	1/10W	Resistor (Chip)	1	
R819	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	1	
R820	ERJ3GSYJ332V	3.3K	1/16W	Resistor (Chip)	1	
R821	ERJ3GSYJ333V	33K	1/16W	Resistor (Chip)	1	
R822	ERJ3GSYJ104V	100K	1/16W	Resistor (Chip)	1	
R823	ERJ3GSYJ102V	1K	1/16W	Resistor (Chip)	1	
R824	ERJ3EKF1241V	1.24K	1/16W	Resistor (Chip)	1	
R825	ERJ3GSYJ102V	1K	1/16W	Resistor (Chip)	1	
D001	PJVDRLS7111	Diode			1	
D101	PJVDEC10QS03	Diode			1	
D102	PJVDEC10QS04	Diode			1	
D301,302	PJVDRLS7111	Diode			2	
D303	PJVDRLZ1612	Diode			1	
D801	PJVDD1F10	Diode			1	
D802	PJVDEC10QS03	Diode			1	
D803	PJVDEC10QS04	Diode			1	

Ref.No.	Part No.	Part Name and Description	Per Set	Remarks
D804	PJVDRLZJ5.6B	Zener Diode	1	
D806	PJVDEC10QS03	Diode	1	
D807,808	PJVDRLZJ5.6B	Zener Diode	2	
D809	PJVDRLZJ3.6B	Zener Diode	1	
X002	PJVCSACS3200	X' Tal	1	
X301	PJVCSACS1693	X' Tal	1	
Q101	PJVTMUN5111	Transistor	1	
Q102	PJVTMUN5211	Transistor	1	
Q203	PJVTMUN5111	Transistor	1	
Q301	PJVTMSB1218R	Transistor	1	
Q801	2SJ234	Transistor	1	
Q802	PJVTMSD1819R	Transistor	1	
Q803	PJVTMSB1218R	Transistor	1	
Q804	PJVTMSD1819R	Transistor	1	
Q805	PJVTMUN5111	Transistor	1	
Q806	PJVTMSD1819R	Transistor	1	
Q807	PJVTMUN5211	Transistor	1	
Q810	2SC3518	Transistor	1	
Q811	PJVIDTB113EK	Transistor	1	
Q812	PJVTMUN5211	Transistor	1	
Q813	2SD2153	Transistor	1	
Q814	PJVTMUN5111	Transistor	1	
Q815-817	PJVTMUN5211	Transistor	3	
Q818	2SB1427	Transistor	1	
Q819,820	PJVTMSD1819R	Transistor	2	
Q821	PJVTMUN5111	Transistor	1	
Q822	PJVTMUN5211	Transistor	1	
Q823	2SD2153	Transistor	1	
CN001	PJJS1089Z	Connector	1	
CN100	PJJS1093Z	Connector	1	
CN301	PJJS1092Z	Connector	1	
CN302	PJJS1091Z	Connector	1	
CN303	PJJS1090Z	Connector	1	
CN304	PJJS1088Z	Connector	1	
CN801	PJJS850Z	Connector	1	
L004,101	PJCZCLR1ZA	Filter	2	
L301	PJLQ90Z	Coil	1	
L302	PJLQ94Z	Coil	1	
L303	PJLQ83Z	Coil	1	
L304	PJLQ91Z	Coil	1	
L803	PJLQ105Z	Coil	1	
L804	PJLQ106Z	Coil	1	
L805	PJLQ97Z	Coil	1	
VR301	EVM1YSX50B24	20K VR	1	
VR302	EVM1YSX50B15	100K VR	1	
F101	PJXBACCP2E25	1A Fuse	1	
F801	PJXBACCP2E50	2A Fuse	1	
SW005	PJSH1A63Z	Switch	1	
SW006	PJSSX024Z	Switch	1	
SW801	PJSH2B02Z	Switch	1	
SW802	PJSH1A65Z	Switch	1	
BAT1	PJJT331Z	Battery Terminal +	1	
BAT2	PJJT329Z	Battery Terminal -	1	
J001	ERJ3GSY0R00V	Dummy	1	
J004	ERJ6GEY0R00V	Dummy	1	
J005	ERJ3GSY0R00V	Dummy	1	
J301,302	ERJ3GSY0R00V	Dummy	2	

11.4 Sub Board





Ref.No.	Part No.	Part Name and Description			Per Set	Remarks
IC203	PJVINJM3416V	IC			1	
C037	ECUV1C104ZFV	0.1	16V	Ceramic	1	
C209,210	ECST0JA106	10	6.3V	Electrolytic	2	
C211,212	ECUV1H222KBV	2200P	50V	Ceramic	2	
C213,214	ECUV1H272KBV	2700P	50V	Ceramic	2	
C215,216	ECUV1H221KBV	220P	50V	Ceramic	2	
C219,220	ECST1AD107KR	100	10V	Electrolytic	2	
C221-224	ECUV1C104ZFV	0.1	16V	Ceramic	4	
Q204-207	2SD1757	Transistor			4	
R079,081	ERJ3GSYJ473V	47K	1/16W	Resistor (Chip)	2	
R083,085	ERJ3GSYJ473V	47K	1/16W	Resistor (Chip)	2	
R205,206	ERJ3GSYJ222V	2.2K	1/16W	Resistor (Chip)	2	
R207,208	ERJ3GSYJ393V	39K	1/16W	Resistor (Chip)	2	
R209,210	ERJ3GSYJ104V	100K	1/16W	Resistor (Chip)	2	
R211-214	ERJ3GSYJ102V	1K	1/16W	Resistor (Chip)	4	
R215-218	ERJ3GSYJ103V	10K	1/16W	Resistor (Chip)	4	
R219,220	ERJ6GEYJ220V	22	1/10W	Resistor (Chip)	2	
R221,222	ERJ3GSYJ104V	100K	1/16W	Resistor (Chip)	2	
R223,224	ERJ3GSYJ222V	2.2K	1/16W	Resistor (Chip)	2	
CN002	PJJS1100Z	Connector			1	
CN201	PJJS1086Z	Phone Jack			1	
L201-203	PJLQ91Z	Coil			3	
SW001-004	PJSH1A64Z	Switch			4	
VR201	PJVV24C08	VR			1	
J002,003	ERJ6GEY0R00V	Dummy			2	
J201	ERJ6GEY0R00V	Dummy			1	